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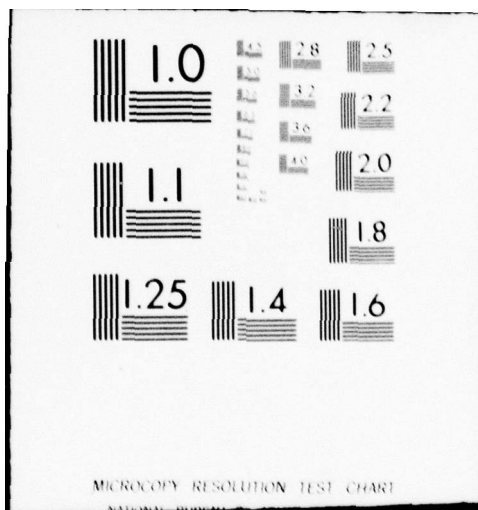
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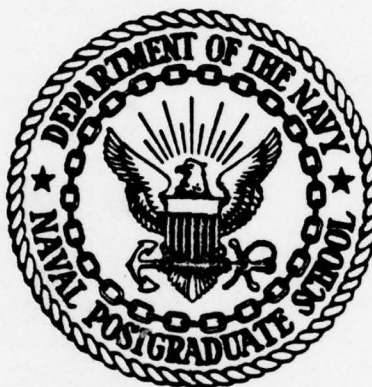
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Navy Supply Support for Foreign
Developed and Manufactured Equipment

by

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Lieutenant Commander, Supply Corps
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Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

The United States Navy currently owns 532 foreign-produced equipments and this number is expected to increase as a consequence of U. S. commitments to NATO. Supply support of these equipments is vital to the missions of the Navy. This thesis begins with an examination of the international cooperative programs between the United States and other NATO nations which provide the United States Armed Services with foreign-manufactured equipments. The current procedures of the U. S. Navy's Ship Parts Control Center for determining the initial and follow-on supply support for both U. S. and foreign-manufactured equipments is then reviewed. The problems associated with the support of the 532 foreign equipments are identified. Finally, suggestions for improvements in the present support procedures are made.

TABLE OF CONTENTS

I.	INTRODUCTION -----	9
II.	BACKGROUND -----	12
	A. MILITARY ASSISTANCE GRANT AID -----	12
	B. FOREIGN MILITARY SALES PROGRAM -----	15
	C. BEGINNING OF COOPERATIVE DEVELOPMENT -----	16
III.	PROGRAMS UTILIZED IN OBTAINING FOREIGN EQUIPMENT ---	19
	A. COOPERATIVE PROGRAMS -----	19
	1. Current U. S. Policy -----	19
	2. Current U. S. Participation -----	22
	3. Advantages To The United States -----	23
	4. Obstacles To Cooperative Programs -----	25
	5. Barriers To Codevelopment And Coproduction -	29
	B. OFFSETS AMONG NATO COUNTRIES -----	31
	1. Depart Of Defense Policy -----	32
	2. Approaches And Arguments To Offsets -----	34
IV.	PROVISIONING OF SYSTEM STOCK -----	37
	A. DEPARTMENT OF DEFENSE POLICY -----	37
	B. PROVISIONING AT A NAVY INVENTORY CONTROL POINT -	39
	C. ASSIGNMENT OF NATIONAL STOCK NUMBER -----	44
	D. SUPPORT OF NON-STOCKED ITEMS -----	45
V.	FOLLOW-ON SUPPORT -----	47
	A. UNIFORM INVENTORY CENTRAL PROGRAM -----	47
	B. LEVELS COMPUTATIONS -----	51

VI.	U. S. SUPPORT OF FOREIGN MANUFACTURED EQUIPMENT --	53
	A. MAGNITUDE OF FOREIGN EQUIPMENT SUPPORT -----	53
	B. PROVISIONING METHOD FOR FOREIGN ITEMS -----	55
	C. ASSIGNMENT OF NATIONAL STOCK NUMBER -----	56
	D. FOLLOW-ON SUPPORT OF FOREIGN ITEMS -----	58
	E. SUPPORT OF NON-STOCKED ITEMS -----	60
	F. SUPPLY SUPPORT AGREEMENTS -----	61
VII.	ALTERNATIVES -----	63
	A. PROVISIONING -----	63
	B. FOLLOW-ON SUPPORT -----	64
VIII.	CONCLUSIONS AND SUGGESTED TOPICS FOR FURTHER STUDY -----	67
IX.	LIST OF REFERENCES -----	71
	APPENDIX A: List of Coproduction Programs -----	73
	APPENDIX B: Sample of TWAMP -----	78
	APPENDIX C: COSDIF Model -----	81
	APPENDIX D: Variable Threshold Formula -----	84
	APPENDIX E: Reorder Point Determination Flow Chart -----	86
	APPENDIX F: MARK Code Designators -----	90
	APPENDIX G: List of APLs With Foreign FSCM -----	92
	APPENDIX H: Sample of Supply Support Agreement -----	104
	INITIAL DISTRIBUTION LIST -----	119

TABLE OF ABBREVIATIONS

APL	- Allowance Parts List
ASO	- Aviation Supply Office
COSAL	- Coordinated Shipboard Allowance List
DDP	- Demand Development Period
DLSC	- Defense Logistics Service Center
DOD	- Department of Defense
EAM	- Electronic Accounting Machine
FMSO	- Fleet Material Support Office
FSC	- Federal Supply Classification
FSCM	- Federal Supply Code for Manufacturers
HSC	- Hardward Systems Command
ICP	- Inventory Control Point
MASO	- Military Assistance Sales Order
MDF	- Master Data File
MILSTRIP	- Military Standard Requisition and Issue Procedure
MRU	- Minimum Replacement Unit
NATO	- North Atlantic Treaty Organization
NAVSEA	- Naval Sea System Command
NAVSUP	- Naval Supply System Command
NIIN	- National Item Identification Number
OBRP	- On Board Repair Parts
P-NICN	- Permanent Navy Item Control Number
PC/SL	- Procurement Cycle/Safety Level
PCLT	- Procurement Leadtime
PTB	- Program Time Base

PTD	-	Provisioning Technical Documentation
RDR&E	-	Research Development, Test and Engineering
RIC	-	Repairable Identification Code
S&I	-	Standardization and Interoperability
S&R	-	Standardize and Rationalize
SPCC	-	Ships Parts Control Center
SSA	-	Supply Support Agreement
T-NICN	-	Temporary Navy Item Control Number
TWAMP	-	Time-Weighted Average Month's Program
UADPS	-	Uniform Automated Data Processing System
UICP	-	Uniform Inventory Central Program
WSF	-	Weapon System File

I. INTRODUCTION

In this interdependent world, the United States Armed Forces are employing more and more foreign-manufactured weapon systems and equipments. Three factors caused the increased use of foreign equipment: (1) The standardization of weapon systems among NATO nations, (2) Offsets, and (3) The availability of lower-priced quality items abroad.

In the last ten years many studies have been conducted on how to support weapon systems and equipments that the United States has sold to other countries. The Navy Material Command (NAVMAT) and Navy Supply System Command (NAVSUP) have recently established offices to coordinate the policies and procedures the Navy utilizes in providing support to other countries. However, little research has been conducted on the nature and extent of the support of equipments purchased by the United States from other countries. This study was done to fill that void.

This study examines the international cooperative programs between the United States and other countries which provided the U. S. with foreign equipment, what procedures have been used to support this equipment, and what changes are required for the effective support of foreign equipment. It begins with a review of different foreign policy programs through which the United States cooperates with other countries. In particular the programs of codevelopment, coproduction

and offset are studies and evaluated because they dominate the procurement of foreign-manufactured equipment for the U. S. Military Services.¹ Some of the factors included in the evaluation are: (1) balance of payment, (2) availability of resources, (3) willingness to cooperate, (4) national pride, (5) trade restrictions (business and legal), and (6) national engineering standards.

Because the supply of spares and repair parts is essential to the effective deployment of any weapon system, the United States policies and procedures for providing initial and follow-on support are then reviewed for both domestic and foreign items. The purpose of this review is to identify areas where changes can be made to increase the supply effectiveness of foreign-manufactured equipments.

The third phase of this study is an attempt to determine the magnitude of foreign equipments. A listing of all equipment and their Federal Supply Code for Manufacturers was provided by SPCC. In order to determine the manufacturing country and type of equipment, copies of the Allowance Parts List (APL) were obtained from the master files at Naval Supply Center, Oakland, California. In reviewing these APLs, questions arose concerning the assignment of stock numbers and the collecting of demands for items not stocked in the supply system. A visit was made to SPCC, NAVSUP, and Naval Sea

¹Codevelopment and coproduction definitions are provided on p. 19.

System Command (NAVSEA) to interview personnel as part of the effort to obtain answers to those questions and details about the present procedures used for support of foreign-manufactured equipments.

The fourth phase presents alternative methods for providing more effective initial and follow-on supply support for foreign manufactured equipments. With the increased emphasis on the United States to purchase more foreign equipment, a recommendation is made for additional studies on the support of foreign-manufactured equipment; several topics for future research are suggested.

II. BACKGROUND

A. MILITARY ASSISTANCE GRANT AID

The North Atlantic Treaty Organization (NATO) was created in 1949. This treaty created an opportunity to reorganize all defense production with a view to making the most economical use of limited funds and manpower by utilizing fewer and more efficient sources of production and supply. (3: 187) In the early years of the alliance, the European members received enormous quantities of surplus defense materials, chiefly of World War II vintage, from the United States under the Military Assistance Grant Aid Program.

The Grant Aid Program has been an important contributing factor to the initiation of coproduction programs by the European members of the alliance in two ways. First, it provided United States-made equipment to European countries to enable them to commence coproduction of an American-made weapon. Second, it served as an impetus to European countries to organize "follow-on" cooperation development and coproduction institutions and programs to modify and improve upon earlier generation weapons. (3: 30)

Over the past thirty years Grant Aid has taken the form of both contributions of military equipment, weapons, and services that were granted without reimbursement to allies and friendly nations and training of foreign friendly nations' officers and enlisted men at United States service schools.

Although Grant Aid has been almost completely phased out for nations of Western Europe, some aid is still being given to countries on the periphery of the Sino-Soviet bloc. (3: 187)

The Military Assistance Grant Aid Program was accelerated by the Foreign Assistance Act of 1961. This act provided the authority to furnish military assistance without charge to eligible foreign countries that shared a determination to resist the expansionism of communist-inspired aggression, but lacked the means to finance the full cost. The material, logistic support, and related training furnished under this type of assistance was tailored to bolster the recipients internal security and self defense. This act was amended in 1975 and now the President must advise Congress before any foreign assistance program can be undertaken.

Within the overall Military Assistance Grant Aid Programs, recipient countries are categorized according to the nature of the objectives of the military assistance being provided. The following is a list of special program categories used:

1. Forward Defense Programs

Forward Defense Programs provide assistance to those countries exposed to a direct threat of communist aggression because of their geographical proximity of Soviet bloc but which do not have resources to provide for their own defenses.

2. Alliance For Progress Security Programs

Alliance for Progress Security Programs have as their objectives the establishing of a Latin American military leadership dedicated to democratic constitutional order,

maintaining internal security, and promoting social and economic development. These are mainly programs for maintenance of internal security and civic action programs, although they are contained within the scope of the Military Assistance Program.

3. Military Base Programs

Military Base Programs provide military assistance to countries in which the United States has access to military bases and installations essential to the deployment of the United States military strength in support of planned strategy.

4. Grant Aid Phase-Out Programs

Grant Aid Phase-Out Programs are those which provide for fulfillment of prior year commitments to economically recovered nations.

5. Free-World Orientation Programs

Free-World Orientation Programs provide modest amounts of military assistance to a number of underdeveloped and emerging nations where it is important to the security interests of the United States and the common defense of the Free World to encourage resistance to the extension of communist influence.

6. U. S. Force Support and Military Assistance Program

U. S. Force Support and Military Assistance Program administration is essentially an "all other" category. It includes a share of the costs involved in support of the North Atlantic Treaty Organization Infrastructure and International Military Headquarters. Also included in this category are

the Department of Defense's costs involved in administering and managing of these special military assistance programs. (3: 32)

B. FOREIGN MILITARY SALES PROGRAM

The Foreign Military Sales Program was originated in 1961 as an effort to reduce and ultimately terminate grant aid to any country having sufficient resources to equip and maintain its own military forces. The goal of the Foreign Military Sales Program is to supplement, augment, and, together with cooperative development and coproduction, eventually replace Grant Aid Assistance to the maximum degree possible. (20: 3)

The United States has conducted intensified efforts to promote international sales of U. S. Military equipment since 1961. In doing so, the United States has had three dominant aims:

To promote the defensive strength of the allies, consistent with U. S. political-economic objectives.

To promote the concept of cooperative logistics standardization with allies.

To offset the unfavorable balance of payment resulting from essential U. S. military deployment abroad. (3: 35)

The sales program is directed toward making available to friendly foreign nations those defense articles and services not generally available for purchase by nations through U. S. commercial sources. Sales of unclassified military articles may be made directly from commercial sources up to \$25 million limitation. However, if the articles are classified or can

best be provided through Department of Defense courses, they may be furnished by either withdrawal from existing stocks or initiating procurement action for the country.

Prior to entering into a contract for procurement, the foreign country must have provided a "dependable undertaking". This means a firm commitment by the purchasing country that it will pay the full cost of new production or the performance of defense services. Under a dependable undertaking, the purchaser agrees to make funds available in such amounts and at such times as may be necessary to meet the payment required by the contract. Also the country agrees to assume any damages or costs that may accrue from their cancellation of this contract.

The Military Assistance Appropriation (Category 6 of the preceding section) may be used at times to finance sales to eligible countries. Credit is provided to authorized countries on terms calling for repayment with interest. When military assistance funds used to extend such credit are repaid, they are credited to the existing military assistance appropriation and are available for the purpose of furnishing further cash or credit terms. (3: 36)

C. BEGINNINGS OF COOPERATIVE DEVELOPMENT

In 1949, Belgium and the Netherlands were the first to attempt to join together in the production of an experimental military aircraft. The effort was unsuccessful. (3: 190) It was not until 1954 that a successful multinational project

came about. Several NATO countries decided to pool their efforts to design and produce a "NATO Lightweight Strike-Fighter" aircraft. After the Supreme Allied Command (Europe) prepared the general specifications, designs were drawn up and three prototypes were developed and constructed. One design survived the testing, the Italian FIAT G-91, equipped with a British Bristol Orpheus engine and a French landing gear. It was produced in Italy and the Federal Republic of Germany. The aircraft entered into squadron air force service in both countries. (8: 126)

Encouraged by the success of this jointly produced aircraft, the newly formed NATO Defense Production Committee started a similar project in 1957 to produce a new maritime patrol aircraft. Operational characteristics were issued by NATO military authorities and circulated to aircraft manufacturers. This was the first time that a group of nations undertook jointly the design and development based on operational requirements. (8: 127)

The United States should be credited with accelerating the NATO coordinated production of military systems that followed. At a Paris meeting of NATO heads of government in December, 1957, Secretary of State Dulles called for the initiation in Europe of a coordinated program of research, development and production for a selected group of modern weapon systems. This was followed by a United States Government formal offer to make available American technical knowledge and experience in manufacturing modern weapons. The NATO nations quick

response to the offer made it possible to complete arrangements for joint production of two missiles, the ground-to-air Hawk, and the air-to-air Sidewinder. (3: 195)

The number and variety of weapons continued to expand rapidly during the 1960's, ranging from the adaptation of the U. S. Mark 44 torpedo by Italy and France, to the joint production of battle tanks, and the development of vertical or short take-off and landing aircraft. The greatest coproduction attempts in this period was a five-nation joint program which produced over 1,000 United States developed F-104G Super Starfighter aircraft. (7: 33)

The United States and other NATO countries have continued to have exchange programs and coproduction of weapon systems. From 1967 to 1975, the United States was involved with eighteen countries in coproduction projects for sixty-five different items. (19: 20) A list of coproduction agreements from 1960 through 1975 is provided in Appendix A.

III. PROGRAMS UTILIZED IN OBTAINING FOREIGN EQUIPMENT

The United States, in an effort to modernize and standardize NATO Nations' defenses, has embarked on cooperative programs with other countries. These programs are "codevelopment", "coproduction", and "offsets" and have been defined by the Department of Defense as follows:

Codevelopment - The sharing of the financial and technological responsibilities for developing an item, subsystem or system.

Coproduction - Any program wherein the United States Government, under the protection of an international agreement, either directly through the Arms Export Control Program or indirectly through specific licensing arrangements by designated commercial producer to acquire substantial "know how" to manufacture or assemble, repair, maintain, and operate, in whole or in part, a specific weapon, communication or support system, or an individual military item.

Offset - A procedure in which the seller agrees to purchase items, subsystems or systems from the country purchasing the defense equipment to offset a portion of the sale price of the equipment. (14: 2)

A. COOPERATIVE PROGRAMS

1. Current U. S. Policy

The policies for the current approach to cooperative programs was set forth by both President Ford and President Carter. In an address to the North Atlantic Council in Brussels during 1975, in support of the North Atlantic Treaty Organizations greater efficiency and reduced costs, President Ford stated:

A generation after its creation, the alliance wastes vast sums each year, sacrificing military effectiveness. We have simply not done enough to standardize our weapons. We must correct this. We must also agree among ourselves on a sensible division of weapons development programs and productions responsibilities. (17: 5)

President Carter spoke to a similar forum on 10 May 1977. His remarks at the North Atlantic Treaty Organization Ministerial House, Lancaster House, England included:

There have been real increases in allied defense spending. But difficult economic conditions set practical limits. We need to use limited resources wisely, particularly in strengthening conventional forces. To this end:

- We must combine, coordinate, and concert our national programs more effectively.
- We must find better ways to bring new technology into our armed forces.
- We must give higher priority to increasing the readiness of these forces.

.....The long-term defense program should emphasize greater alliance cooperation to ensure that our combined resources are used more effectively. It should take full advantage of work already done within the alliance.

.....As we strengthen our forces, we should also improve cooperation in development, production and procurement of alliance defense equipment. The alliance should not be weakened militarily by waste and overlapping. Nor should it be weakened politically by disputes over where to buy defense equipment. (5: vii)

The Chief Executives have not been alone in focusing attention on NATO and foreign weapon procurement. Congress also supports this effort. It has been the opinion of Congress for several years that the United States should consider

foreign weapons. In fact, since 1976, it has been the policy of Congress that the United States make an annual evaluation to determine if foreign systems can meet our requirements. (17: 23)

Military leaders have repeatedly expressed concern about military mix of weapons present in the European theater. On 15 January 1977, Secretary of Defense Donald Rumsfeld presented to Congress the third report on Rationalization and Standardization within NATO. In this report he outlined the DOD's support of Weapon System Standardization in NATO and included a large section of the U. S. consideration of European weapon systems, (17: 7)

Dr. Malcolm R. Currie, while serving as Director of Defense Research and Engineering, supported cooperative research and development efforts with NATO allies. In a report to Congress in January, 1977, he reported on cooperative efforts to reduce the shortfall between the United States Research Development, Test and Engineering (RDT&E) Program and that of the Soviets by making greater use of the allied RDT&E Programs. The other objective was to increase NATO military force effectiveness in meeting its world-wide commitments beyond NATO. (4: viii-2)

Former Supreme Allied Commander Europe General Andrew Goodpaster reported in 1974 that the lack of equipment standardization in the alliance and the rampant proliferation of separate equipments and systems has reduced the effectiveness of the allied forces in Europe by about thirty percent.

In central Europe alone NATO forces have twenty-three different families of combat aircraft, seven different families of main battle tanks, eight different families of armored personnel carriers and twenty-two different families of anti-tank weapons. NATO's naval forces have six different anti-ship missiles, eight different surface-to-air missiles, thirty-six different air control radars, and twenty different calibers of weapons over 30 mm. (16: 157)

2. Current U. S. Participation

The United States, by September, 1976, was involved in twenty-nine international cooperative programs with twelve other countries. While some of these international cooperative programs were multilateral, most were bilateral agreements.

One of the largest cooperative programs the United States has been involved in is a multilateral coproduction program for the F-16 with four NATO countries. This cooperation program has planned aircraft orders as follows: United States Air Force 650, Belgium 102, Netherlands 84, Denmark 48, and Norway 75. The program requires that ten percent of the United States aircraft or their subsystems and forty percent of the European consortium aircraft or their subsystems be built in Europe. In addition, fifteen percent of aircraft or their subsystems ordered in the future by non-NATO countries will be built in Europe. (6: 593)

3. Advantages to the United States

Bilateral and multilateral cooperative development and production programs have the potential of offering advantages to all countries involved. From the United States' point of view, the pooling of economic and technical resources in developing and producing standardized defense equipment can result in the following benefits:

a. Cost Benefits

A primary incentive for becoming involved in international cooperative (codevelopment and/or coproduction) programs is the potential for reduced development costs. By teaming up with other countries who share in the development cost, or by allowing the coproducing countries to specialize in the manufacturing of subsystems or items which they can produce economically, the U. S. Department of Defense may be able to provide its operational forces with equipment at a lower initial cost. For example, the Air Force has estimated a savings of fifty percent on the Side-Looking airborne radar - a cooperative advanced development between the United States and the Republic of Germany. All of the work is being done in the United States but the cost is to be shared equally. (20: 10)

Another example of cost savings is the agreement between the United States and the United Kingdom for the development of fuel cells. The objective is to develop an efficient, advanced, low-cost electrical power source. The work has been divided equally, with each country funding its

share. Each country will have full rights to the results of this joint effort. (20: 11)

b. Technical Benefits

Foreign scientific talent and technical expertise can fill gaps in the United States research and development. In certain areas, such as forward area air defense, armored vehicles, sonars, metals research, and shallow-water acoustic research, European technological ability is regarded as being equal to or better than that of the United States. (20: 12)

Typical projects receiving this benefit were the Navy's shallow-water acoustic research program with the Federal Republic of Germany and the Netherlands for gathering basic hydroacoustic data and the research program with the United Kingdom involving the Planar Array Sonar. In the latter case, the Navy had concentrated on increasing the capability of its AN/SQS-26 Sonar rather than incur high costs for a surface ship sonar called Planar Array. Fortunately, the United Kingdom was doing advanced development work in this area; and, by entering into a bilateral cooperative program, the United States was able to capitalize on the United Kingdom's efforts. For an estimated contribution of twenty-five percent of the program cost, the Navy obtained rights to designs, concepts and data not otherwise available. (19: 25)

c. Access to Different Geographical Areas

Often, the Department of Defense must develop a piece of equipment that will operate in all types of environmental and geographical conditions. Participation in cooperative

programs may permit the United States to test such equipment in geographical areas which might not otherwise be available.

One such program in which this benefit has been realized is the Azores fixed acoustic range. The United States, along with seven other nations, have entered into a multi-lateral international cooperative program to establish the Azores acoustic range. The Azores area has the most desired environmental and geographical conditions for testing voice communications through water. (20: 5)

4. Obstacles to Cooperative Programs

Initiating and participating in an international codevelopment and coproduction program has not been easy because of various formidable obstacles. Some of these not only prevent programs from starting but they also influence the nature and outcome of programs which do start.

a. Balance of Payment

The balance of payment considerations have become a crucial negotiating point in determining cost-and-effort sharing arrangements on cooperative programs. (20: 16) The fluctuations in international monetary exchange rates can complicate the problem and cause a redistribution of burdens and benefits on programs in which participants exchange funds.

b. Fear of Eroding the Employment Base

Because much of the codevelopment and coproduction work would be done outside of the United States, it could be argued that such programs lead to increasing the United States

unemployment. However, employment is not affected when work is split among participating countries with each country paying only for its own work. (20: 19)

Various measures have been adopted to protect the domestic employment base. One of the more well-known measures is the Buy American Act (41 U. S. C. 10a), which is concerned primarily with restricting the acquisition of foreign goods and supplies. However, the Secretary of Defense can wave this restriction if national security considerations require it. There is also the Department of Defense Appropriation Act (Public Law 92-570) which bars the Department of Defense from spending research and development dollars abroad when a United States company can do the same work at a lower cost.

c. Technological Capabilities

The technological superiority of the United States in a substantial number of scientific and technical areas is well established among NATO nations. The U. S. is reluctant to share this knowledge because it does not want to take the risk of losing its competitive edge over other countries. An example of this is the U. S. refusal to provide certain information to European countries on the wire-guided torpedo program. (2: 17)

d. Military Security

Military security restrictions may limit international cooperative research and development among the allies

in certain defense areas. Within the United States, participation in an international cooperative research and production program in the defense area must operate within military security limits and national disclosure policies. (20: 24) This obstacle is noticed in that the United States is reluctant to share any technical and scientific knowledge on strategic weapons with NATO countries which are near a Soviet bloc country.

e. Availability of Resources

The resource constraint is an ever-present disadvantage to defense cooperative programs. Cooperative programs are designed to reduce the financial burden to participating countries. Nevertheless, a lack of money, particularly among smaller nations, reduces cooperative efforts. Examples of this are Portugal being forced to drop out of the Seasparrow Surface Ship Self-Defense Missile Program and Canada having to abandon its involvement with the Hydrofoil. (20: 25)

f. Willingness to Cooperate

The willingness to cooperate appears to be somewhat different for the United States than for its allies. To the United States, such programs are a means of reducing development costs, achieving standardization, avoiding costly duplication, and exploiting the benefits its foreign allies have to offer. The allies view such programs as a means of avoiding unsupportable cost burdens and increasing their sales and profits.

g. Differences in Coproduction Policies

Differences in coproduction policies are also a major disadvantage to international cooperative programs. To the allies, cooperative research and development go hand-in-hand with cooperative production. In European cooperative programs, development and production costs and markets are shared.

The Department of Defense prefers not to combine coproduction with codevelopment because of domestic employment considerations. (9: 41) However, it has not been able to get cooperative programs started on engineering development involving large systems unless coproduction has been part of the agreement. This was true of Project Mallard, the XJ-99 vertical takeoff engine, the NATO Seasparrow, and the NATO Hydrofoil fast patrol boat. (20: 22)

h. Subassemblies and Component Parts

Before the United States embarks on a coproduction program with another country, a determination must be made regarding the availability of subassemblies and component parts to support the program. Over-optimism as to what is actually available from the coproducing nations has led to serious production disruptions when it was discovered that the support equipment is unavailable. This becomes an even more acute problem when there are shortages of long lead-time items. This happened on the U. S./China F-5 coproduction program. (1: 65)

5. Barriers to Codevelopment and Coproduction

The advantages of international programs are attractive. Nations avoid duplication of efforts by sharing in development, and benefit from the reductions in costs. In addition, cooperative projects potentially aid in lowering trade barriers, strengthening alliances and security in the free world, and promoting international harmony and understanding. Yet, success is not guaranteed for cooperative programs. In fact, failures are more frequent. (2: 13) There are barriers to success which are numerous and often deep rooted.

a. National Pride and Self-Interest

Nationalism is a fact of international life and is the United States' number one barrier to cooperative codevelopment and coproduction programs. (2: 15) The reluctance to cooperate is attributable to the "not wanted here" or the "not invented here" syndrome. No matter what foreigners develop, it is not considered by some to be as good as that of their own country. Likewise, many do not want to depend on a foreign supplier, because they fear it could compromise their national interests at some time in the future.

b. Trade Restrictions

Protectionism has been a serious drawback to international cooperation. Each nation has established taxes and customs which were designed to protect the national interests of that nation. In negotiating cooperative agreements related to international coproduction and acquisitions,

nations must compromise on these national trade arrangements. At the start of the Hawk Program, a successful coproduction venture with our European allies, taxes and duty rights had to be suspended by the United States. (2: 17)

c. Business and Legal

The conduct of commerce is not standardized among countries of the free world. Business and financial practices, credit policies, and contracting methods vary significantly. The differences are exemplified by variations in accounting practices. The treatment of cost allocation, valuation and disclosures in Europe is not consistent with accepted U. S. procedures. Contingency reserves, surplus entries, property, plant and equipment, considerations of financial statements, and rental commitments are among the entries that are handled differently. (2: 20) This incompatibility between systems makes it difficult to negotiate contracts equitable to all parties.

Legal problems are also troublesome. International laws relating to patents and proprietary data do not exist. In addition, the related national laws vary greatly from one nation to another. Reaching agreements with respect to licensing and the use of data has been a major bottleneck. (2: 20)

d. National Engineering Standards

From a technical standpoint, the most mentioned obstacles relate to differences in national engineering standards. The metric system is the most common. Other differences

in standards include the gauge of sheet metal, plate, wire, the soldering of electronic components and the format of engineering drawings. (2: 18)

An example of the problems of different standards was illustrated by the Field Artillery Firing Radar (RATAC). This radar was a joint development of the French and Germans which was purchased for immediate use in Southeast Asia by the United States. After modification of this radar to meet United States standards, it became a common stocked item in the United States inventory. During modification phases, it was noted that the soldering on the European version was too thin to meet U. S. standards. The thicker soldering required larger parts to withstand the additional heat. The larger parts could not fit in the European housing and hence the housing had to be redesigned. (2: 10)

e. Language Barriers

Translators are available in NATO countries to overcome most general language problems. However, technical words frequently take on new meaning in translation due to refinements in languages. Also, occasionally, there is not a word equivalent existing in the second language. (3: 182)

B. OFFSETS AMONG NATO COUNTRIES

Efforts to standardize the weapon systems that NATO members procure have encountered resistance within the alliance primarily due to reasons of economic self-interest and national pride. These concerns have resulted in demands for "offsets"

whenever a new weapon system is under consideration for standardized NATO-wide procurement. The demand is for the producing country to buy some equipment from the purchasing country to offset part of the monetary expenditure associated with the planned initial procurement of the weapon system.

In most cases, a foreign military sale is for only a few units of equipment. Therefore, it is virtually impossible for an offset agreement to be on a unit for unit basis, particularly if the foreign government is not involved in the development of the system. A common practice to meet offset commitments is to identify subsystems or components and agree to purchase some or all of these items to meet DOD requirements providing a satisfactory price, schedule and quality can be obtained. Another approach is for a contractor or subcontractor to purchase items of like technology for commercial applications.

The domestic considerations in most developed countries requires that local industry benefit from significant government purchases. While offsets complicate foreign military sales, they frequently are essential if NATO countries are to own and operate standardized military equipment. Therefore, it frequently becomes desirable to enter into an offset arrangement, either (1) on the purchase and sale of defense equipment, or (2) on an individual sale.

1. Department of Defense Policy

The U. S. Secretary of Defense, in a memorandum to the Secretaries of the Military Departments and other Defense

Agencies, set forth the DOD policy for all offset agreements. The following is a brief summary of this policy:

a. Offset agreements are to be approved by the Secretary or the Deputy Secretary of Defense after the approval of the Department of State.

b. Offset agreements should be negotiated and a basic understanding reached prior to the final acceptance of the United States Department of Defense offer and acceptance contract (DOD Form 1513 FMS) by the foreign customer in order to include in this letter of offer the impact that such agreements may have on DOD Price and Availability.

c. Offset agreements will include guidelines concerning any restrictions of acceptability of competition from foreign government-owned or subsidized companies.

d. On the sale of a particular item or items where an offset agreement has been reached prior to the signing of the contract, the offset will not officially begin until after the contract has been signed.

e. In offset agreements related to specific weapon system purchases, the United States contractors and associated subcontractors which benefit from the foreign military sale will assume the primary responsibility for fulfilling the offset.

f. Foreign firms have the basic responsibility for marketing their products to United States industry and DOD.

g. Procurement of all items by DOD shall be open to participation by foreign firms under such offset agreements to the extent provided in the agreement.

h. DOD will allow foreign firms in those nations having offset agreements the same access to and knowledge of DOD's requirements as afforded any United States firm within the provisions of the National Disclosure Policy and DOD Industrial Security Guidance.

i. Offset agreements shall be stated in fiscal dollars or some definable percentage related to constant-year dollars. In the event of currency fluctuations, the agreed amount will be the constant-year dollars and exchange rate at the time of the offset agreement final signature. (14: 6)

2. Approaches and Arguments to Offsets

"Offsets" are non-tariff distortions to international trade because they force transactions to take place that normal market incentives would not induce. Offsets therefore tend to create inefficiencies and raise costs associated with standardized weapons procurements. (21: 6)

Initially, there were two approaches to the offset programs. One approach, which was termed "protectionist", was based on a guaranteed and equal flow of procurement between the United States and the purchasing country. The second was termed "competitive" and, while seeking to obtain agreements within NATO on standardized procurement needs of the alliance, left determination of the magnitude of the offset open to competitive bidding among potential suppliers. (21: 21)

One of the major arguments raised by NATO countries against competitive bidding is that European defense industry is too small and fragmented to compete effectively against

United States' firms in the development and production of any major weapon systems. The so-called "technology gap" that many of the American firms have over the potential European competitors is a decisive advantage to the United States. Another advantage is the lower unit cost which results from the larger production runs possibly due to the size of the United States defense procurements. (21: 23)

A common practice now used by the United States to soften the "winner-take-all" policy is to identify subsystems or components which can be produced competitively in the foreign country and have the prime contractor agree to purchase some or all of those items from the foreign source in meeting United States DOD requirements, provided that satisfactory price, schedule, and quality can be obtained.

As a final argument there has been a subtle inconsistency in American policy toward Europe for more than two decades. (21: 24) On one hand, the United States has tried to promote development of an European community as an integrated and independent political-economic entity; while, on the other hand, American policy has tried to promote the NATO alliance as a more integrated and effective military entity through the use of U. S. manufactured systems. This inconsistency arises from the fact that efforts to promote the economic and political integration of Europe require preferential treatment. To enact this treatment would require the liberalization of tariffs and government contracting regulations with foreign countries. But the difficulties of obtaining such liberalizations

have forced many of the United States procurements to be made from its own producers rather than from other NATO countries.

The United States Department of State has searched for areas of production in which costs of European NATO countries are competitive with those of U. S. producers. For such areas, the United States has initiated trade liberalizations in order to open additional non-military markets. These new markets could stimulate employment and provide resources for further technological development, thereby reducing demands for "offsets" associated with standardized military equipment.

IV. PROVISIONING OF SYSTEMS STOCK

A. DEPARTMENT OF DEFENSE POLICY

The Department of Defense policy for stockage criteria and the determination of requirements for secondary item spares and repair parts, beginning with the initial provisioning stage, is set forth in the DOD Instruction 4140.42 of 7 August 1974. The scope of this policy covers all spares and repair parts in support of end items of material acquired by the DOD or its components.

The Department of Defense Instruction 4140.42 requires the DOD components to provide maximum initial support within available resources. This is to be implemented through policies that provide a coordinated approach to the following elements: Program development, depth of stocks provided in the initial requirements computation, range of items selected for initial stockage, and requirements estimation from the beginning of a new program to the end of the Demand Development Period (DDP).

To facilitate implementation of this policy, DOD has also provided some requirements determination guidelines and mathematical models to aid the DOD components. Changes can be made to these requirements but only to hedge against the probability of overprocurement. Changes to the models must have a financial base as established by the Department of Defense and an objective of minimizing system downtime or

time-weighted requisitions short. The control over these modifications are at the headquarters level responsible for logistics and material support for that DOD component.

The DOD components are required to review each new item against a DOD standard basis for stockage. Any item which is selected as an insurance item for wholesale level stockage is to be stocked in minimum quantities. For demand based items, a probabilistic approach will be used to compare the forecast cost of stocking an item with the forecast cost incurred by not stocking the item and subsequently needing it. Demand-based items will be considered for stocking only if the non-stockage cost is equal to or exceeds the stockage cost.

During the Demand Development Period (DDP), DOD components are required to give special management attention to newly provisioned items in order to release restrictions placed on initial requirements computations. The restrictions and the use of estimated requirements factors are to be gradually relaxed after the first six months and dropped completely by the end of the DDP.

Each DOD component is also required to maintain a two-year demand history file of part numbered and not carried stock numbered items requisitioned at the wholesale level. The purpose of this file is to identify items for review and possible stockage which subsequently meet the Inventory Control Point (ICP) stockage criteria based on actual demands.

DOD policy does not apply to war reserve range and depth stockage.

B. PROVISIONING AT A NAVY INVENTORY CONTROL POINT

The Ships Parts Control Center (SPCC) Internal Instruction 4400.30C of 31 August 1977 defines provisioning as:

The process of determining the range and quantity of items (i.e., spares and repair parts, special tools, test equipment and support equipment) required to support and maintain an end item of material for an initial period of service. Its phases include the identification of items to be supported, the establishment of data for cataloging and inventory management, technical file loading, technical and allowance list documentation and the procurement and delivery of necessary support items with related end articles. The process involves full consideration of quality data inputs and of necessary related actions to assure the required quality results.

The policy and computation procedures for determining initial systems stock are also set forth in Instruction 4400.30C. The basic step is the translation of Provisioning Technical Documentation (PTD), submitted by either a contractor or Hardware System Command (HSC), into data elements which represent program and item support logistics decisions for procurement of initial system stock. Only new or non-stocked items managed by SPCC are to be considered for stockage during provisioning. Once an item is designated as a stocked item and the initial buy is made, no additional wholesale buys are made unless based on actual demands.

The basic processing for provisioning new items involves the development of a budget constraint and determination of

item requirements based on this constraint. A description of the major functions performed by SPCC as outlined in FMSO's Supply Systems Design Specifications are provided in this section.

1. Item Candidate Selection

Item candidate selection determines which items are to be considered for system stockage. This process first checks to determine if the item is managed by SPCC; second, if the item is a new item of supply or an established item which is not stocked; and third, if the item is a very high cost insurance item. If all of these conditions are met, the item will be considered a candidate for stockage. If any one of the above conditions is not met, the item will not be considered for stockage.

2. Demand Forecasting

Forecast of demands are made for a twelve-month steady-state period, for a twelve-month initial period, for a period equal to the procurement lead time, and for a period equal to the procurement lead time plus one quarter.

For consumable items, all the demand forecasts represents expected demands during the appropriate period. For repairable items the twelve-month steady-state demand forecast is actually a forecast of the number of units attrited (failed and were not repairable) during that period. The other three demand forecasts represent expected attrition during the associated period plus expected repair during the turn-around-time.

Basic to the demand forecasting is the forecasting of the schedule for installations of the end item. These data are then smoothed into a form called "Time-Weighted Average Month's Programs" (TWAMP). The formulas for TWAMP are described in Appendix B, along with a sample of a TWAMP computation.

3. Funding Constraint

A budget constraint is next developed which serves as a cost ceiling in the determination of items to be stocked. This constraint is based on range and depth criteria as specified by DOD policy for demand-based items and criteria specified by the System Commands for insurance items. The value of the constraint is the total value of the depth of those items which qualified under the DOD criteria.

The process for determining whether an item should be stocked as demand based is made using a technique called COSDIF. The COSDIF technique compares the expected cost of stocking an item to the expected cost of not stocking the item. If the cost of not stocking the item equals or exceeds the cost of stocking it then the item should be considered for stocking as demand based. A description of the COSDIF formula is provided in Appendix C.

Any item that fails to qualify for stockage as demand based is checked next to determine if it qualifies for stockage as an insurance item. Insurance items are identified by PTD as having no predicted failure rate with normal usage;

however, should a failure occur, the lack of a replacement item would seriously hamper the operational capability of the system. Also, the HSC can identify insurance items which it determines necessary to the support of its programs. Insurance items will be stocked in quantities of Minimum Replacement Unit (MRU) as established by PTD.

4. Item Requirements Determination

The final determination of which items to be stocked is based on the budget constraint developed above combined with a technique referred to as "variable threshold".

The first step in this program is to determine the "variable threshold value" for each item which has been selected as a candidate for stockage. This value is equal to the item's probability of at least one demand during the procurement lead time divided by its unit cost. These variable threshold values are then listed in descending order. The variable threshold formula is given in Appendix D.

The next step is to determine an unconstrained depth quantity based on the procurement lead-time demand and a particular assumed demand probability distribution. A normal distribution is used when annual or procurement lead-time demand values are equal to or greater than twenty. For annual demand between one and twenty, a negative binomial distribution is used. The Poisson distribution is used for annual demand of one or less. The process begins with the calculation of the "variable risk value" for each item. It is equal to the item's holding cost divided by the sum of its holding

cost and an essentially-weighted shortage cost. This risk is assumed to be the probability of a stockout during lead time when the item is stocked initially to the desired depth quantity. The depth quantity is then determined by comparing the risk value with probabilities of stockouts obtained from the assumed probability distribution. Finally, this unconstrained depth quantity is constrained to be no more than two year's demand if consumable or no more than procurement lead time plus one quarter's demand if repairable.

The final step is to actually select the items to be stocked. All items which were determined early in the process to be insurance items are selected first. The depth of these items will be the MRU of the item. The total value of all of these items is then subtracted from the funding constraint value determined in step three above; the remaining funds are to be allocated to the demand-based items. Selection of these latter items begins with the items at the top of the list made earlier and continues down the list until the total dollar value of included depths consumes the remaining funds. Depth for demand-based items selected are constrained as discussed above. Any item not selected as an insurance item or selected by the variable threshold techniques will not be initially stocked in the system.

A simulation analysis was conducted by FMSO to determine the most cost-effective method for establishing a range and depth of initial stock items. This analysis evaluated a

combination of four stock range rules and three initial depth computations. The methods evaluated included:

1. Stocking every item to a depth of one-year's demand.
2. Stocking items which meet the COSDIF criterion to a depth of lead time plus one-quarter's demand.
3. Stocking items which meet the variable-threshold criterion to a depth of lead time plus one-quarter's demand.
4. Stocking items which have a positive reorder point (based on UICP Risk Formula) to a depth of lead time plus one-quarter's demand.
5. Stocking items which meet the variable-threshold criterion to a depth equal to the initial reorder point or at least one unit.
6. Stocking items which have a positive reorder point to a depth equal to this initial reorder point or at least one unit.

This study indicates that the variable threshold and the UICP policies are most cost-effective methods. However, the variable threshold method is more flexible and easier to use and is the one now used at SPCC.

C. ASSIGNMENT OF NATIONAL STOCK NUMBER

After an item has been processed through provisioning, SPCC assigns it a Temporary Navy Item Control Number (T-NICN). If the item is not selected for system stock the T-NICN is changed to a Permanent Navy Item Control Number (P-NICN) for

cataloging purposes. SPCC indicates the type of NICN by a coding system in the first four digits of the control number - 0098 for T-NICN and 0099 for P-NICN.

Once an item has been selected for system stock, information on this item is forwarded to the Defense Logistics Service Center (DLSC) for screening. This screening operation first determines if the item has already been assigned a National Item Identification Number (NIIN); if no number has yet been assigned, then a NIIN is assigned to the item at that time. A NIIN is a unique nine-digit number assigned to identify an item of supply within the Federal Cataloging Program.

When SPCC receives a NIIN as a result of DLSC screening, they add to it a four digit Federal Supply Classification (FSC) Number. This new thirteen digit number becomes the National Stock Number (NSN). The T-NICN assigned to an item earlier is now replaced in all files by the NSN.

D. SUPPORT OF NON-STOCKED ITEMS

Items which are not system stocked as a result of the initial provisioning are requisitioned by the customers using the manufacturer's part number. The stock point activity will fill this requirement by a procurement action from a company that manufactures this item which, in many cases, was the original manufacturer. For this same item to be carried in system stock, it is required to have three demands in six months. Then the item becomes a candidate for review

and stocking in the system. After the item is reviewed and it is determined that the demand is of a recurring nature, the item is assigned a NSN and procured for system stock.

The policy and procedure for reporting to the ICP these demands on open purchase non-stocked items is set forth in NAVSUP Notice 4400 of 2 February 1977. The activity that procures non-stocked items from a manufacturer is required to forward a document to the ICP for recording of demand only. The ICP is to receive and record this data on each item in order to determine when the item is a candidate for stock. This document, with all of the information on the non-stocked item, is known by its document identifier code BHJ.

V. FOLLOW-ON SUPPORT

The Navy's Inventory Management policy is set by the Navy Supply System Command (NAVSUP), and has been designed and developed by the Fleet Material Support Office (FMSO). The system that the Navy has in operation at its Inventory Control Points (ICP) is called the Uniform Inventory Central Program (UICP). The UICP system contains many procedures and parameters to govern budget execution and the level of review activity required for inventory management.

The Navy's UICP system is designed to determine when to order supplies and in what quantities for each item through the use of mathematical formulas and certain information associated with the item. Before actual procurement of an item, an Inventory Manager has the responsibility of reviewing the UICP model decisions for those cases where there are unique factors peculiar to certain items and the computer is not programmed to consider this uniqueness.

A. UNIFORM INVENTORY CENTRAL PROGRAM

Ship Parts Control Center (SPCC), one of the Navy's ICP, employs UICP for control of an inventory which consists of more than 450,000 different items having an estimated worth of around \$1,800,000,000. (12: 3) In order to manage an inventory of this magnitude, there are eight different operations performed by UICP. The following is a brief description

on these operations as outlined in FMSO's Inventory Managers Manual.

1. Requisition Processing

This operation receives checks, accumulates, and fulfills those customer's requests that cannot or should not be satisfied at the stock point.

2. Transaction Item Reporting

This operation keeps track of the movement of the items in the Navy's supply system. The transaction reports are submitted by the stock points when they issue or receive material or adjust their inventory. The transaction item reporting operation maintains assets data and collects observations of demand and procurement lead time as well as repair-related data.

3. Cyclic Levels and Forecasting

This operation determines how much to buy or repair and when to buy or repair. A basic part of this operation is the computing of averages and deviations to be used in forecasting demand, carcass return, lead time, turnaround times, and repair service rates.

4. Planned Program Requirements

This operation establishes a record of requirements which are known or anticipated and need not be predicted by the UICP cyclic forecasting procedures.

5. Supply Demand Review

This operation compares current inventory assets to the requirements and recommends supply decisions to the item Inventory Manager.

6. Cyclic Repair Management

This operation forecasts repair requirements and prepares repair schedules.

7. Stratification

This operation determines assets and forecasts requirements over the budgeting horizons and is used for budget preparation.

8. Disposal

This operation takes actions to rid the inventory of those items that are held in excess quantities.

The Master Data File (MDF) and the Weapons System File (WSF) are the two primary data base files used by UICP systems. These two files contain data necessary to maintain and manage the inventory at SPCC.

The information found in the MDF is filed and indexed using the National Item Identification Number (NIIN). Each NIIN record file in the MDF includes the current inventory position as well as demand, carcass return, lead time, and turnaround time observations, averages, and deviations. The MDF also contains descriptive information such as nomenclature, shelf life, and physical dimensions.

The Weapon System File (WSF) is a file of information about the weapon systems or equipments being managed. It contains data related to end-item weapons, systems, subsystems, equipments, components, and sub-components. Records in the WSF are filed and indexed by the Allowance Parts Lists (APL) number.

The WSF is structured in three levels, designated as A, B, and C. Level A has records of specific end-use weapons or equipment. Level B has records for equipments and components which are related to an end-use equipment. Level C has records of equipments and components broken down into their individual parts.

The UICP system also uses other files to support the two major files. These files consolidate information regarding particular supply management functions. The following is a brief description of the seven other files.

1. Planned Program Requirements File

This file contains requirement data pertaining to programmed needs of field activities.

2. Due On/Due Out File

This file maintains a record of ICP-directed issues and expected receipts from both procurement and repair activities.

3. Transaction History File

This file contains a two-year record of all transactions submitted to the ICP. It is the primary source of historical data on demands, carcass returns, lead times, and turnaround times.

4. Document Status File

This file maintains the up-to-date records of requisitions received at the ICP.

5. Information History File

This file contains an accumulation of the most recent three years of system non-recurring demand and five years of recurring demand.

6. Program Support Interest File

This file maintains records of those items for which SPCC has program support responsibilities but the items are managed by another military service or Defense Logistics Agency.

7. Back Order File

This file contains records of requisitions that could not be satisfied from on-hand stock and the customer is awaiting later delivery.

B. LEVELS COMPUTATIONS

The Navy's ICPs use the UICP to compute when an order should be placed for an item and the quantity that should be ordered. These procedures will be discussed briefly below. A detailed flow chart of the process is given in Appendix E.

1. Order Quantity

In an attempt to better control the inventory, all items managed by SPCC are distinguished by a MARK code classification. The MARK code of an item is determined by its demand and unit cost. The five MARK code classifications are shown in Appendix F. The MARK code designator enables the inventory rules to be simplified since only five sets of rules are necessary. Items that have the same MARK code

classification are considered similar enough to be treated alike.

Every ninety days SPCC updates forecasted demands, lead-time averages, and other variabilities required to compute the order level. The procurement order cost is determined to be one of three values from the item's MARK designator, whether or not the estimated value of the order quantity exceeds the maximum unpriced purchase order value, and whether the procurement is advertised or negotiated.

The procurement order cost, the forecasted quarterly demand, the unit cost, and a fixed holding rate are used in determining an Economic Order Quantity (EOQ). The actual order quantity is set to be the maximum of either the EOQ, one quarter's demand, or one unit but constrained to be no larger than five-year's demand.

2. Reorder Point

SPCC sets the reorder level for determining when to place an order based on a constrained stockout risk formula and a demand distribution based upon lead-time demand and the MARK code.

3. Safety Level

The setting of a reorder quantity by definition sets the safety level. Safety level is the difference between the constrained reorder level and the demand during lead time.

VI. U. S. SUPPORT OF FOREIGN MANUFACTURED EQUIPMENTS

A. MAGNITUDE OF FOREIGN EQUIPMENT SUPPORT

The Federal Supply Code for Manufacturers (FSCM) can be used to determine the number of foreign equipments that are supported by SPCC. The FSCM (a five-digit code) identifies the manufacturer of a particular equipment. Any equipment that is manufactured in the United States has a five-digit numeric code. Those equipments that are manufactured in other countries have an alpha-numeric code with the first digit being the alpha-code. This alpha-code identifies the country in which the equipment is manufactured and the remaining four numeric digits identifies the company within that country.

A computer listing obtained from the SPCC Weapon System File contained five hundred and thirty-two different equipments (identified by an APL number) haveing an alpha-numeric code for the FSCM. A duplication of this computer list was made and has been included as Appendix G. The following is a summary list of the FSCM letter, the country denoted by that letter, and the number of APLs with that letter in the FSCM.

<u>FSCM</u>	<u>COUNTRY</u>	<u>NO. OF APLS</u>
A	Italy	2
D	Germany	55
H	Sweden	19
K	England	381
N	Norway	9

<u>FSCM</u>	<u>COUNTRY</u>	<u>NO. OF APLS</u>
S	Japan	6
U	United Kingdom (less England)	59
Z	Australia	1

The Master APL File at the Naval Supply Center, Oakland, was next used to determine the types of equipment produced by these countries. These equipments covered a complete range from very simple, such as valves and controllers with only a few repair parts, to very complex radars, gun mounts, etc., with a large number of spares and repair parts.

These foreign-made equipments are used on board a variety of United States Navy Ships. Among these are the three salvage tugs built in England, the Navy's new NATO Patrol Hydrofoil (PHM), the DD-963 class destroyers, and a number of Military Sealift Command Ships (MSC). With the exception of the MSC ships, all of these equipments are cataloged and supported by SPCC. For those equipments on MSC ships, SPCC provides a cataloging service but does not provide any system stock for support. Of the total number of foreign equipments in the WSF, SPCC personnel estimate that forty percent are used on MSC ships.

The NATO Patrol Hydrofoil, now under development, has five foreign developed and produced equipments and systems that require provisioning and support by SPCC. These equipments are: The PL-41E GYRO (Germany), the AN/SPS-63 True Motion Navigation Radar (Italy), a Diesel Engine (Germany),

the MK-75 Gun (Italy), and the MK-94 Fire Control System (Holland).

B. PROVISIONING METHOD FOR FOREIGN ITEMS

The provisioning process explained in Chapter IV is used for determining initial support for both U. S. and foreign-manufactured equipments. Because the fixed and variable costs developed and used by SPCC are independent of where the item is manufactured, the initial range of foreign items stocked is probably seriously in error. The greatest error is most likely in the ICP cost of procurement and the cost of a spot buy in the event of a demand during stockout. Extra costs may result in the procurement from foreign-manufactured items.

DOD Instruction 4140.39 provides a list of functional elements that an ICP should include in the cost of procurement. The following elements from that list would most likely increase with foreign procurements:

1. Direct Labor Cost Associated with the Preparation of the Purchase Orders and Constraints

The preparation of a solicitation for a foreign manufacturer may be more expensive; extra costs may result from extra legal reviews and translations, when required.

2. Cost Involved in Administration of a Contract

An increase in administration costs may result because of larger travel and living expenses associated with on-site visits to the manufacturing plants.

3. Indirect Labor and Support Cost

The communication costs (Autodin, telephone, teletype, and mail) may be greater because of the distance between the United States and foreign manufacturers.

C. ASSIGNMENT OF NATIONAL STOCK NUMBER

The procedures for assigning a NICN, before selecting items for stock, are the same for both U. S. and foreign-manufactured items. After a foreign item is selected for initial system stock, information on this item is forwarded to DLSC for screening. Until recently, any item that had a foreign manufacturer and had not already been assigned a NSN was rejected and sent back to SPCC for assignment of a local control NSN.

This different procedure by DLSC affects foreign items in three ways.

1. Items Not Assigned a NSN by DLSC

In comparing some old and new APLs of foreign equipment, it was noted that many items were still identified by the same T-NICN even after three years on the books. This was considered to be unusual since APLs are updated every quarter and most T-NICN are changed to NSN within a year after information is forwarded to DLSC. In a meeting with SPCC personnel it was determined that these items were not assigned a NSN due to an oversight attributable to special procedures in assigning NSN to items that DLSC rejected.

2. Identification of Common Items

The NSN that is assigned by DLSC identifies the item regardless of the service that manages it. Any item that is assigned a local control number does not have this same capability. Therefore, SPCC items from the foreign countries cannot be identified to the same items that are used in another U. S. service.

3. Identification with Other NATO Countries

Many of the foreign items that are in the U. S. inventory system are also stocked by other NATO services. Since these foreign items were not centrally assigned a stock number, like items have different numbers and cannot be identified as being similar.

The Assistant Secretary of Defense, in a memorandum of 18 May 1978, reported:

Effective 1 January 1978, DLSC achieved the capability to receive and process NATO Stock Number requests from U. S. Services/Agencies for items of supply manufactured in the NATO countries. This fulfills a long-standing agreement among all NATO countries that: (1) each item of supply of international use would have only one stock number assigned; (2) the producing countries would assign the stock number; and (3) the NATO Stock Number would be used in the U. S. logistics system.

This new policy and procedure has been set forth in the Defense Integrated Data System Manual and requires the U. S. Government contracting authorities, when purchasing equipment from foreign sources, to cite the NATO Codification Clause in their contracts. This clause will assure the necessary technical documentation is acquired in order to request the NATO Stock Number.

The new procedure for assigning NATO Stock Number still has DLSC screening the item to determine if a NATO Number is assigned. However, if no number is assigned, the information is forwarded to the producing country and it is required to assign the item a NATO Stock Number. By having the producing country assigning the stock number, like items stocked by other countries will have the same stock number. When the NATO Stock Number is returned to DLSC, it is recorded in their records and then forwarded to the ICP.

D. FOLLOW-ON SUPPORT OF FOREIGN ITEMS

A meeting was held by Command Naval Surface Forces Pacific in May, 1978, to discuss supply support problems of foreign equipment used on the salvage tugs, ATS 2 and 3. The major problem reported was a very long procurement lead time on items that were not stocked. An example of this was the replacement of some non-stocked pipes and valves on these ships during an overhaul at the Navy Ship Yard, Pearl Harbor. Because the piping system on these ships were metric, the replacements could not be procured from U. S. manufacturers. Therefore, all the replacement pipes and valves had to be ordered from England and a long lead time resulted.

Also in this meeting it was reported that the effectiveness of foreign items that were system stocked was about the same as that of U. S. items.

1. Support of Stocked Items

The follow-on support of foreign-manufactured items that are stocked during provisioning becomes part of the UICP

system and the responsibility of the Inventory Manager. The determination of order quantity, safety level, and reorder point is done by the same process as that of U. S. items. Inventory Managers at SPCC made their decisions on when and what quantity to buy in the same for both U. S. and foreign items.

There are some important factors not considered in level setting of foreign items that should be examined. The influence of these factors would cause the reorder point quantity to increase which would, by definition, increase the safety levels. These factors are: (1) The availability of the item should that country disagree with the U. S. foreign policy; (2) The availability of the item in time of war; (3) Pressure cannot be as easily applied by the U. S. on a foreign manufacturer for expediting a procurement as it can on a U. S. manufacturer.

An attempt was not made to determine the past supply support effectiveness of foreign-manufactured items. This study was not done because, as previously stated, no major problems have been reported on the support of foreign items stocked in the supply system and because of the great amount of time required to complete this study. To determine the supply support effectiveness of foreign-manufactured repair parts on the 532 foreign equipments managed by SPCC, the following steps would be required.

a. Copies of the APLs for all of the equipments would have to be obtained from the WSF.

b. A list could then be compiled from the APLS of the repair parts identified by NSNs.

c. The manufacturer's part number would need to be determined for each item in the above list. This can be done from microfiche records at SPCC that list the different manufacturer's part numbers associated with each NSN. These part numbers will be used to identify the company that has the capability to manufacture this item.

d. Another microfiche record would be needed to determine the items that are only manufactured in a foreign country. This step would be required since many items are manufactured in both the U. S. and a foreign country, and the effectiveness analysis should be limited to those items manufactured solely in another country.

e. From the refined list of Step d, SPCC can provide a two-year history of support for each item. This history would include the total number of requisitions, the number that was filled from available stock, and the number of requisitions that were backordered.

2. Support of Non-Stocked Items

In reviewing the APLs of foreign equipment, it was noted that very few items not initially stocked (identified by P-NICN) had ever been stocked later. This was determined by first taking a random sample of two hundred P-NICN out of approximately four thousand repair parts. Then the P-NICNs were checked in the MDF to determine if they had been changed

to a NSN. Out of this sample only one item had changed to a NSN and been stocked.

An investigation was made to determine why so few of these items had received the requisite three or more demands. One reason, which effects both U. S. and foreign items, was that only large supply activities, such as Naval Supply Centers and large Naval Air Stations, were required to forward a BHJ document to the ICP. Therefore, all demands from smaller activities, such as shipyards, tenders, and Naval Stations, which also purchased this type of material, were not recorded. Another reason was that not even some of the larger activities were forwarding this required document to the ICP. The transaction receipt records at SPCC indicated that one Supply Center had not reported any BHJ transactions in a six-month period, and another had reported an average of only four transactions a month. However, a third Supply Center of approximately the same size had reported in excess of 1,500 transactions each month. The center which had reported no BHJ transactions was asked why it had not forwarded any such document to the ICP. The response was that the document was not a part of the Uniform Automated Data Processing System and that resources were not available to manually prepare them.

3. Supply Support Agreements

When a foreign government buys a weapon system or military equipment from the United States through the Foreign Military Sales Program, that same country can also obtain a

Supply Support Agreement (SSA) with the military service that has the inventory management responsibility for that system or equipment to the U. S. This agreement allows a customer country to requisition spares and repair parts directly from the United States. Appendix H is a sample of the standard Supply Support Agreement Form. (17: 57)

These agreements enable the purchasing country to maintain a lower level of inventory since backup stock is maintained by the United States. Also a pricing system is established to prevent manufacturers from overcharging for spot procurements of high priority items. Although many other governments procure equipment from the United States and have negotiated Supply Support Agreements for this equipment, the United States has yet to negotiate any similar Supply Support Agreements with foreign countries for support of equipment purchases made by the United States. (17: 12)

VII. ALTERNATIVES

This chapter presents several alternatives by which the Navy could obtain support for foreign-manufactured equipments which are a consequence of the analyses in the preceding chapters. However, prior to discussing any alternatives, a general comment is appropriate. The Department of Defense has the overall responsibility for establishing the policies used by DOD components to support their equipment. Therefore, any major changes in these policies have to be accepted and approved by DOD. However, the Navy has some leeway within these policies and they can establish their own procedures to implement them.

A. PROVISIONING

1. Alternative A

Under this alternative, the Navy would continue utilizing the same methods and procedures in provisioning spares and repair parts for foreign equipment. These procedures are the most cost-effective methods of determining initial range and depth of U. S. items. In continuing the provisioning of foreign equipment with these procedures, procurement lead time may be longer than for U. S. manufacturers. The provisioning procedures will automatically consider any additional procurement lead time.

2. Alternative B

This alternative would use the same procedures for provisioning items but would consider the different costs

involved when procurements are made from foreign manufacturers. The first step in implementing this alternative would be the computation of cost parameters (ICP cost to procure, cost of increase in unit price due to spot procurement) that represent the cost of procurement from foreign manufacturers. These costs would be computed for each country from which the Navy obtains equipment.

The next step would be to use these cost values in the COSDIF formula to determine the range of items. Following this step, the procedures for provisioning foreign items would be the same as those for U. S. equipment.

B. FOLLOW-ON SUPPORT

1. Alternative A

Under this alternative the Navy would continue the same policies and procedures for providing follow-on support for foreign-manufactured items. These procedures are working satisfactorily with the number of items now supported. By using an accurate procurement lead-time demand on foreign items in level setting, the system stock has apparently met the effectiveness requirements as reported by the Inventory Managers.

2. Alternative B

This alternative would use the same UICP system for follow-on support of foreign items but with an increase in the safety level. This increased protection considers the uncertain availability of resupply from other countries.

Reasons for this uncertainty include: (1) the foreign government has a higher priority for the item, (2) the foreign country's company discontinues making the item and data are not available for a U. S. manufacturer to produce the item, (3) the foreign country disagrees with U. S. foreign policy, and (4) the item not being available in time of war. The degree of uncertainty would obviously not be the same for all countries and all times. The degree varies from very little uncertainty for countries such as England and Germany to much higher uncertainty for other countries.

This change in the safety level could be accomplished easily by using a different value for the shortage cost in the risk equation if an item is foreign manufactured. Appendix I shows the associated modification to the level-setting process of Appendix E. The only change to the present procedure would be to add another decision step before setting the value of the shortage cost.

3. Alternative C

Under this alternative the Navy would negotiate a Supply Support Agreement with the government that produced the equipment. The Navy would still maintain a minor inventory of spares and repair parts to support operation. However, this agreement could reduce much of the uncertainty in resupply and the need for larger safety levels.

Besides reducing the safety level, other advantages in negotiating a Supply Support Agreement are:

a. The agreement hopefully helps establish a priority system for the requisitioning government. In the U. S. agreements, other governments are afforded the same priority system as any U. S. customer.

b. The agreement can provide a method of disposing of obsolete and excess stock. The U. S. may avoid the cost of disposing of an obsolete item should it still be required by the other country for support of their equipment. Should the item become obsolete to both countries, the cost is shared.

c. The agreement can establish a fair price system for resupply. Other governments pay the same as U. S. customers plus administration charges (administrative, packing, crating, and handling), with the exception of unit cost and transportation, can be agreed upon in advance of procurement.

d. The agreement can provide arrangements for warehousing. In the U. S. agreements, if storage facilities are adequate, there is no charge for the use of the facility.

VIII. CONCLUSIONS AND SUGGESTED TOPICS FOR FURTHER STUDY

The amount of foreign equipment supported by the Navy at the present time is small when compared to the total amount of equipment supported. However, as pointed out in Chapter III, it appears likely that the number of foreign manufactured items in the Navy supply system will increase considerably. Both the initial and follow-on support of such equipment has used the same methods and procedures as that of U. S. manufactured equipment. To date, this policy has not presented any great problems. This study has discussed some possible changes that could increase the supply effectiveness of foreign equipment and has emphasized that the amount of foreign equipment purchased by the U. S. will be increasing as a consequence of our commitment to NATO.

The major conclusion and recommendation is that further studies should be conducted on support of foreign developed and produced equipment. The following are recommended topics.

A. SUPPLY SUPPORT AGREEMENTS TO AID SUPPORT OF FOREIGN-PURCHASES EQUIPMENT

The United States has many Supply Support Agreements with other governments. However, these agreements are for the support of equipment that the U. S. has sold to another country.

A study is needed on the utility of Supply Support Agreements for equipment the U. S. obtains from other countries. Some of the questions to be answered if the United States were to use a similar agreement for this type of support as that provided in Appendix H are:

1. To what extent will the Navy be able to reduce its inventory levels, and what are the savings gained by this reduction?

2. Will supply effectiveness be affected?

3. What political/military problems will these Support Agreements cause?

4. Will other countries accept the Support Agreements to support U. S. requirements?

B. DETERMINE METHODS FOR IMPROVING THE COLLECTION OF DATA ON NON-STOCKED ITEMS

This study pointed out that the present method used to obtain demand on non-stocked items is ineffective for both U. S. and foreign items. One of the inefficiencies has been not requiring the collection of data from many activities that procure non-stocked items. Another has been that some of the activities required to provide this data to the ICP have been lax in doing so.

Without an adequate method of collecting demands, the supply system cannot be expected to adequately support the equipments. A study is needed to either recommend alternatives to correct the present method or to develop a completely new system to collect the demand data.

C. DETERMINE THE CORRECT COST VALUES TO USE IN THE COSDIF FORMULA

SPCC now uses the same cost values in the COSDIF formula for both U. S. and foreign procured items. As suggested in this study, many of the costs can be expected to be different for the procurement of foreign items. A study is needed to determine the magnitude of these costs.

D. ALLOWANCE PREPARATION OF ON-BOARD REPAIR PARTS OF FOREIGN EQUIPMENTS

The initial allowance of on-hand repair parts is computed to support the ship for a ninety-day period. This process involves the development of APLs and the combining of these lists into a Coordinated Shipboard Allowance List (COSAL). A study is needed to investigate the procedures for developing the COSAL and what effect foreign equipment has on this allowance development. This study would be very timely because SPCC is now processing the allowance documents for the NATO Patrol Hydrofoil (PHM).

E. THE EFFECTIVENESS OF ARMY SUPPORT OF FOREIGN-MANUFACTURED EQUIPMENT

The Army has more foreign manufactured equipment than any of the other U. S. services. Also, it has more coproduction programs scheduled as illustrated in Appendix A. In order to better support these equipments, the Army has established an International Logistics Office. This office has both the responsibility for support of Army equipments that the U. S. sells to other governments and for support of equipments

obtained from other governments. This study could make a comparison of the different systems used to support foreign-manufactured equipment.

F. DEVELOP A PROCEDURE TO ASSIGN NATO STOCK NUMBERS TO FOREIGN-MANUFACTURED ITEMS ALREADY IN THE SUPPLY SYSTEM

This study pointed out that the Defense Logistic Service Center achieved the capability to process requests for NATO Stock Numbers to the producing country in January, 1978. Before that time all foreign items were assigned a local control stock number by SPCC. A procedure is needed to identify these foreign items and process them through DLSC for assignment of a NATO Number. The reason for assigning a NATO Number is to enable the U. S. to identify like items in other U. S. and NATO services.

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APPENDIX A
LIST OF COPRODUCTION PROGRAMS

COPRODUCTION AGREEMENTS

1960 THROUGH 1975

Army Administred Agreements

<u>Other Country</u>	<u>Item</u>	<u>Date of Agreement</u>
Germany	UH-1D Helicopter	May 1965
Italy	M60 A1 Tank	October 1964
	M109 Howitzer	February 1968
	ARCUS 10 Radar System	May 1974
Japan	HAWK Missile System	October 1967
	NIKE HERCULUS Missile System	October 1967
Netherlands	M109 Howitzer	May 1966
Norway	M109 Howtizer	December 1966
Republic of China	General Purpose Vehicles	July 1966
	UH-1H Helicopter	August 1969
	M60 Gun	June 1967
Korea	M16 Rifle	April 1971
	AN/PRC 77 Radio	August 1973
NATO	HAWK Missile System	March 1960
	HELIP	July 1968
Philippines	M16 Rifle	May 1974
Turkey	2.75 Rocket	May 1972
Iran	H-27 Retro	June 1970

Air Force Administered Agreements

Italy	F-104 Aircraft	December 1965
Japan	F-4 Aircraft	April 1969
Republic of China	F-55 Aircraft	February 1973
NATO	F-104 G Aircraft	December 1960

Navy Administered Agreements

<u>Other Country</u>	<u>Item</u>	<u>Date of Agreement</u>
Germany	CH-53 G Helicopters	June 1966
England	F-4 Aircraft	February 1965
	HARRIER AV-8A ²	March 1975
Italy	SIDEWINDER Missile System	April 1974
NATO	SEASPARROW Missile System	June 1968
	SIDEWINDER Missile System	June 1968
Spain	DEG Ships	November 1964

²A reverse of the usual agreement in that the prime contractor was in England and not the United States as it was for all of the others.

PRESENT COPRODUCTION AGREEMENTS

A. F-16 AIRCRAFT - The United States and four other NATO countries have a coproduction agreement for the F-16 aircraft. This aircraft program will be administered by the United States Air Force. The actual aircraft will be assembled in the United States by General Dynamics with all five countries providing some of the equipment. The five countries involved are the United States, Belgium, Netherlands, Norway, and Denmark.

B. ROLAND II - The United States along with France and Germany are developing the Roland II Missile for coproduction. This system would be deployed by the Army and other countries throughout NATO.

C. RH 202 ASSAULT GUN - The United States Army is evaluating the German RH 202 20 mm cannon as a replacement for the United States M-139 20 mm single barrel gun. If the gun is selected after this evaluation, a cooperative agreement will be made.

D. NATO PATROL HYDROFOIL MISSILE BOAT (PHM) - The PHM is a coproduction agreement between the United States, Italy, and Germany. The boats are being built in the United States by Boeing with both Germany and Italy providing some of the equipment.

E. 155 MM HOWITZER AMMUNITION - The United States, England, Germany, and Italy have agreed to standardize the internal ballistics of their 155 mm howitzers. This ammunition will be produced in all of the countries, but now will have the

same internal and external ballistics, assuring interchangeability of ammunition among these countries.

APPENDIX B
SAMPLE OF TWAMP

SAMPLE OF TIME-WEIGHTED AVERAGE MONTH'S PROGRAMS

The determination of system stock is based upon the time-weighted average month's program (TWAMP) through the program time base (PTB). The PTB is determined by the estimation of the value of annual demand (VAD). If the VAD is greater than \$500,000 a PTB of three months is used. For a VAD between \$500,000 and \$50,000 a PTB of six months is used and for any VAD less than \$50,000 a twelve month PTB is used. Deliveries are assumed to occur in mid-month; thus, the cumulative program buildup (B_m) up to and including the last month (m) in PTB is defined as follows:

$$B_m = I_K/2 \text{ when } m = 1 \quad \text{and} \quad B_m = \left(\sum_{K=1}^{m-1} I_K \right) + I_m/2 \text{ when } m \geq 2$$

Where:

K, m are month indices

I_K = number of specified operational units of program
by which the program is incremented during month K
in the PTB.

TWAMP is computed by:

$$TWAMP = \frac{\sum_m B_m}{PTB}$$

Given an example of the following operational units deliveries in a program the TWAMP is computed as follows:

Month	O	N	D	J	F	M	A	M	J	J	A	S
No. of Month	1	2	3	4	5	6	7	8	9	10	11	12
I_K	1	2	2	2	2	3	4	4	4	5	0	0
Bm	.5	2	4	6	8	10.5	14	18	22	26.5	29	29

PTB	TWAMP
3 Month	$(.5+2+4)/3 = 2.2$
6 Month	$(.5+2+4+6+8+10.5)/6 = 5.2$
12 Month	$(.5+2+4+6+8+10.5+14+18+22+26.5+29+29)/12 = 14.1$

In order to derive the quantitative level requirements for an item the TWAMP is multiplied by the number of months for which support is being computed.

PTB	TWAMP	PCLT (12 Mos)
3 Months	2.2	26.4
6 Months	5.2	62.4
12 Months	14.1	169.2

Forecast for demand during Procurement Lead Time (PCLT) on an item with a Best Replacement Factor (BRF) of 1.5 would be determined as follows:

PTB	Item PCLT	times	BRF	times	factors for year	demand forecast
3 Months	26.4		1.5		4	158.4
6 Months	62.4		1.5		2	187.2
12 Months	169.2		1.5		1	253.8

APPENDIX C
COSDIF MODEL

COSDIF MODEL

$$\begin{aligned} \text{COSDIF} = & (F_0/F_D) [C_p + 2HU(R + Q)] \\ & + (1 - F_0/F_D) [C_p(D/Q) + HU(S + Q/2) + C_I F_D] \\ & - (1 - F_0/F_D) [K C_p F_D + PDU + F_D L \text{ MAX } (\lambda E/115 \text{ or } HUD/365 F_D)] \end{aligned}$$

Where:

- F_0/F_D = probability of zero demand in coming two years,
given annual frequency of demand F_D
- C_p = ICP cost of procure
- H = holding cost rate
- U = item unit price
- R = reorder level
- Q = economic order quantity
- D = forecast of annual demand
- S = Safety level
- C_I = cost of issue
- F_D = annual frequency of demand
- K = conversion factor to adjust procurement cost for
non-stocked items
- P = increase in item unit price due to spot buy
- L = procurement lead time
- λ = shortage cost
- E = item essentiality
- 115 is based on average backorder time outstanding in days

The first part of the COSDIF formula is the probability of no demand in two years multiplied by the expected cost to hold that item in inventory for two years. The next part of the formula is the probability of demand in two years multiplied by the holding cost for that item for one year. The third part of the formula is the probability of demand in two years multiplied by the expected cost of not stocking the item and needing it.

APPENDIX D
VARIABLE THRESHOLD FORMULA

VARIABLE THRESHOLD MODEL

$$P = \frac{1 - e^{-DL}}{U}$$

Where:

P = Probability that one or more demands will occur during a lead time per dollar invested

D = forecast of quarterly demand

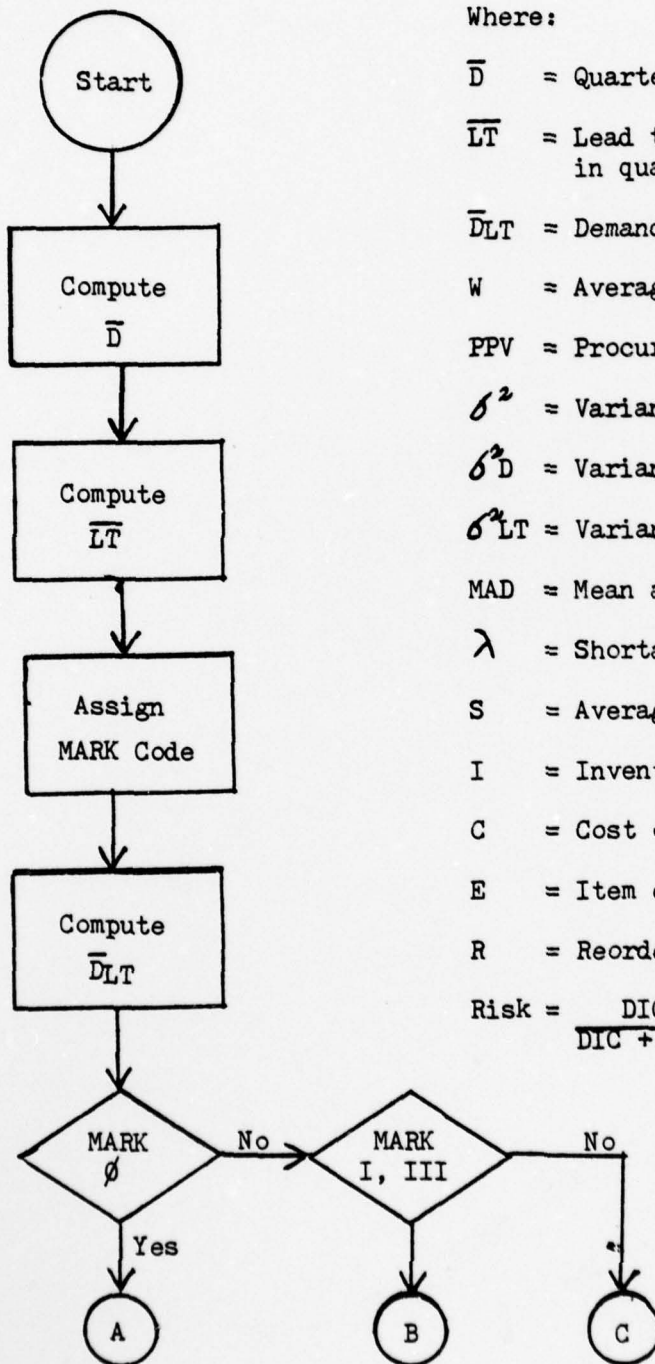
L = lead time (in quarters)

U = item unit price

e = 2.71828

APPENDIX E
REORDER POINT DETERMINATION FLOW CHART

REORDER POINT DETERMINATION FLOW CHART



Where:

\bar{D} = Quarterly demand

\bar{LT} = Lead time forecast for procurement in quarters

\bar{DLT} = Demand during lead time

W = Average requisition in quarter

PPV = Procurement problem variance

σ^2 = Variance

σ^2_D = Variance in demand

σ^2_{LT} = Variance in lead time

MAD = Mean absolute deviation

λ = Shortage cost

S = Average requisition size

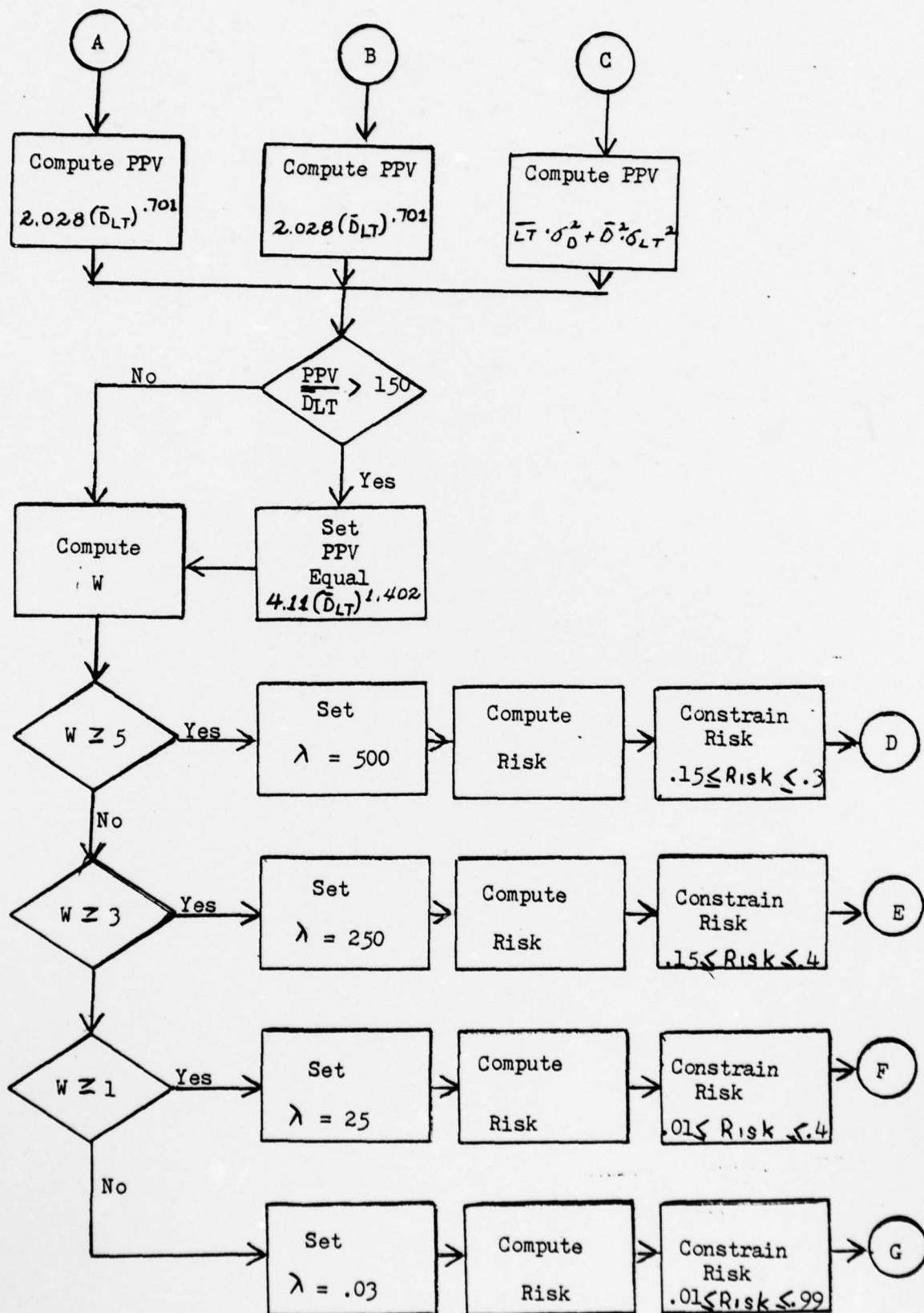
I = Inventory holding rate

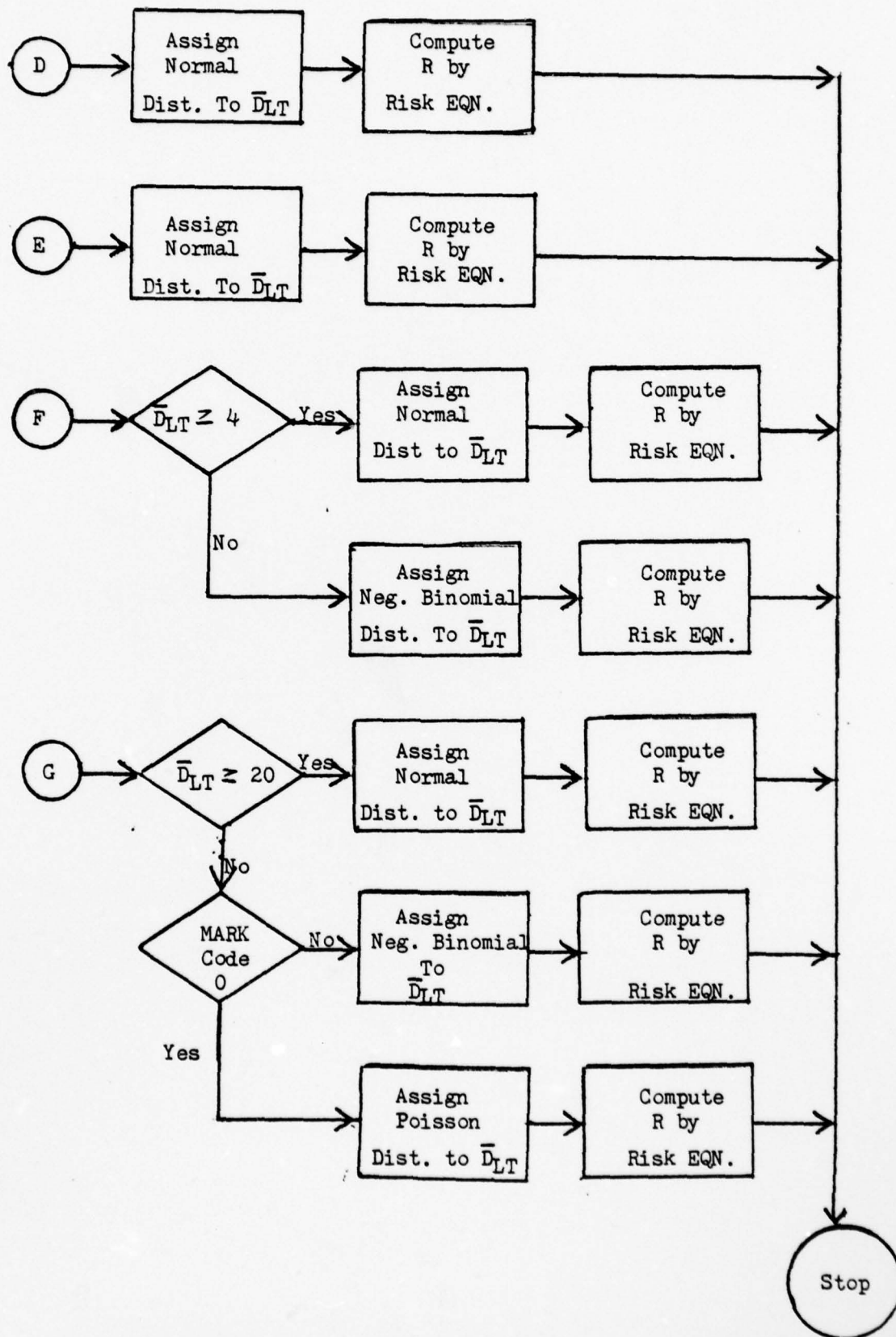
C = Cost of item

E = Item essentiality

R = Reorder level

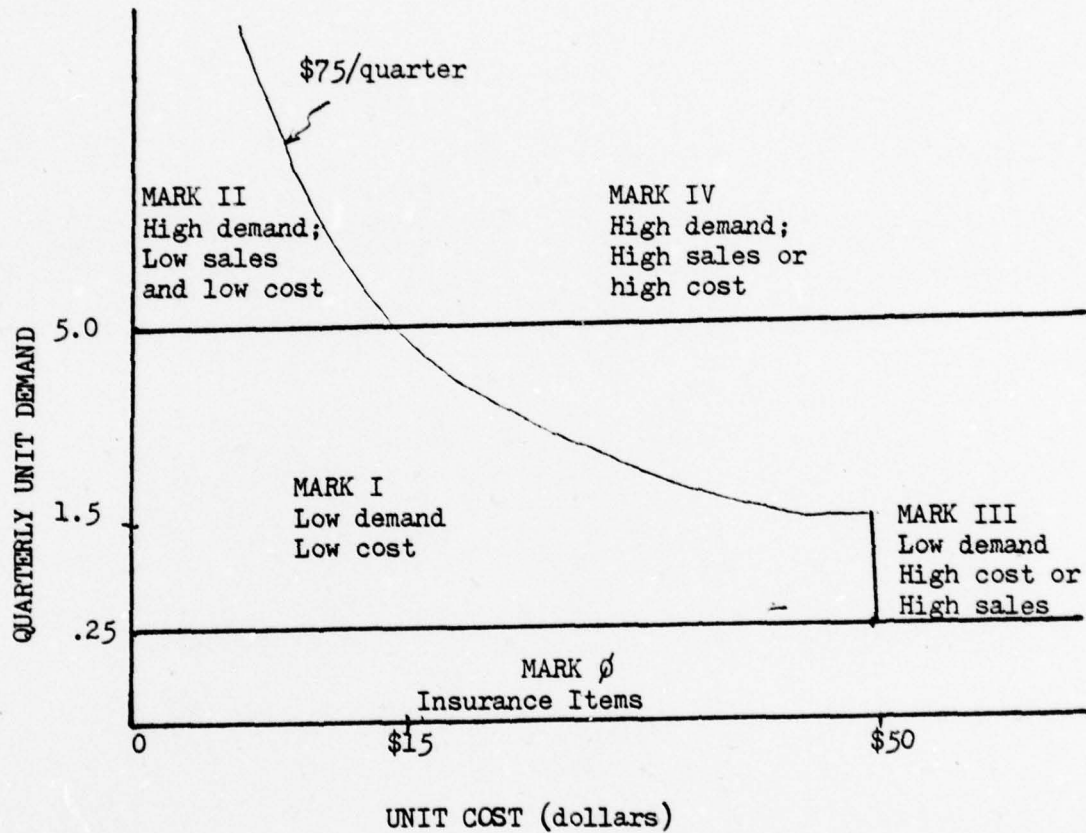
$$\text{Risk} = \frac{DIC}{DIC + \lambda W}$$





APPENDIX F
MARK CODE DESIGNATORS

MARK CODE DESIGNATORS



APPENDIX G
LIST OF APLS WITH FOREIGN FSCM

LIST OF FOREIGN EQUIPMENTS
SUPPORTED BY SPCC

<u>APL NUMBER</u>	<u>FSCM</u>	<u>APL NUMBER</u>	<u>FSCM</u>
00240001	K3339	002400002	K3339
00240100	K3339	002401400	K3339
002405100	K3330	002405400	K3339
006070001	A0199	013050001	D8266
016031788	K2331	016032359	K0084
016032360	K0084	016032361	K0084
016032363	K0084	016032376	K0084
016032377	K-084	016032378	K0084
016032379	K0084	016032380	K0084
016032381	K0084	016032382	K0084
016032383	K0084	018240001	K2374
018240002	K2374	018240003	K2374
018240004	K2374	018270001	K2267
018270002	K2267	018270003	K2267
018270004	K2267	018270005	K2267
018400001	U0789	018400002	U0789
018470001	K4001	018470002	K4001
018510001	D8860	018880146	N0897
018880147	N0897	018880148	D8860
018880149	D8860	018880150	D8860
018880154	U1494	019990015	U1068
019990016	U1068	019990017	U1068

<u>APL NUMBER</u>	<u>FSCM</u>	<u>APL NUMBER</u>	<u>FSCM</u>
019990021	K0084	019990023	K5102
019990030	K5184	032200014	U1841
032200015	U1841	032230016	U1841
032230017	U1841	039990011	D8046
052060001	K0680	053990001	K0357
061900375	K0084	069990005	K1555
079990031	K1795	099990033	K1847
103160004	K6729	119990012	D9645
119990015	D4856	152210028	K1847
152210029	K1847	152210030	K1847
152210031	K1847	152210032	K1847
152210033	K1847	152210034	K1847
152210035	K1847	152210036	K1847
152210037	K1847	152210038	K1847
152210039	K1847	152210040	K1847
152210041	K1847	152210042	K1847
152210043	K1847	152210044	K1847
152210045	K1847	152210046	K1847
152210047	K1847	152210048	K1847
152210049	K1847	152210050	K1847
152210051	K1847	152210052	K1847
152210053	K1847	152210054	K1847
152210055	K1847	152210056	K1847
152210057	K1847	152210058	K1847
152210059	K1847	152210060	K1847

<u>APL NUMBER</u>	<u>FSCM</u>	<u>APL NUMBER</u>	<u>FSCM</u>
152210061	K1847	152210062	K1847
152210064	K1847	152210065	K1847
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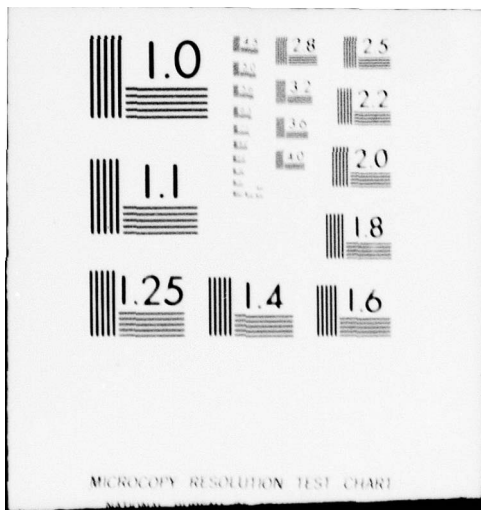
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APPENDIX H
SAMPLE OF SUPPLY SUPPORT AGREEMENT

COOPERATIVE LOGISTICS ARRANGEMENT REGARDING SUPPLY
SUPPORT OF THE ARMED FORCES OF _____ OF THE
UNITED STATES DEPARTMENT OF DEFENSE (U.S.)

I. Purpose

The purpose of this arrangement is to enable the Government of _____ to utilize the organization, facilities and administrative procedures employed by the United States to support Government of _____ specified item common to the Armed Forces of the two Governments on a basis which will:

A. Permit the Government of _____ to obtain logistic support for its military forces equivalent to that provided U. S. Forces for similar common items.

B. Reimburse the U. S. for all expenses incurred in providing defense articles, supplies and services to the Government of _____ in accordance with provisions contained herein.

II. Material Requirements

A. The Government of _____ will provide planning information to the United States, on a timely basis, in order to enable the United States to increase and maintain U. S. stock levels, and an order levels, so as to provide the same levels of supply support for the Government of _____ as for the U. S. Armed Forces.

B. The United States will provide the Government of _____ with a listing of the material required

to be on hand and on order in the U. S. supply system for the Government of _____. The Government of _____ requirements will be computed by the United States utilizing rates estimated to be applicable to Government of _____ forces, so as to insure that stocks are maintained at the levels required to provide Government of _____ supply support equivalent to that provided to the United States. While original estimates of requirements for repair parts will be based on United States estimates of Government of _____ consumption, subsequent estimates will be based on Government of _____ demands. Any reduction by the Government of _____ to the prescribed stock levels will result in a commensurate reduction to the supply support of the item to the Government of _____.

C. As requested by the Government of _____, the United States will provide the Government of _____ technical assistance in the determination of material requirements for Government of _____ stock levels, and on order levels, and annual deliveries.

III. Orders

A. Stock Levels - Utilizing established United States procedures, the Government of _____ will place a Military Assistance Sales Order (MASO), specifying items and quantities, with the United States military authorities in an amount to cover the estimated total cost of material

to be held on hand and on order (and of the services required to increase United States spare parts stock and on order levels) to meet Government of _____ demands.

B. Consumption - (1) The Government of _____ will place an open-end MASO, undefined as to items and quantities, with the United States military authorities utilizing established United States procedures, in an amount equivalent to the estimated first calendar quarter's consumption. This order will be supplemented each subsequent quarter, at least thirty days prior to the beginning thereof, to cover the subsequent quarter's anticipated withdrawals. Such orders and supplements will be limited to a calendar year. Immediately following the close of each calendar year, the orders for such calendar year will be closed out and liquidated.

(2) On a date to be mutually agreed and on or before this same date of each succeeding year, the Government of _____ will collaborate with United States authorities and provide an annual estimate of consumption requirements for the following year, specifying items and quantities, for which incremental and supplemental orders referred to in sub paragraph (1) hereof can be expected.

C. The Government of _____, will, as may be agreed amend the MASO (A and B above), to cover increases or decreases in (1) stock levels held by the United States for the Government of _____, (2) in procurement levels, and (3) Government of _____ consumption requirements. The necessity for these amendments will be

mutually determined, based on demand history, new items entering the system, and revisions in prices.

D. The Government of _____ will place an open-end MASO on the United States military authorities at the beginning of each calendar year to cover the following year's maintenance and modifications of material in storage, if any, and costs of storage at rates developed by the United States for specific classes of supply of material held in stock for Government of _____.

IV. Requisitions and Issues

The Government of _____ will forward its requisitions from one central point and will place such requisitions, using the United States Military Standard Requisition and Issue Procedure (MILSTRIP), upon points designated by the United States authorities. Stock requisitioned will be issued from supply points within United States Military System. The Government of _____ will provide transportation from United States issue points to the Government of _____ destinations. Documents and procedures used by the United States for invoicing and issuing will be compatible with those used by the United States Armed Services. Invoices will be computed utilizing the "standard" United States military price prevailing at the time requisitioned items are issued from United States inventory.

V. Support Priority

A. Requisitions placed by Government of _____ with the United States supply system before stock levels have been increased will be filled from existing United States stock to the extent that United States inventory levels are adequate to permit supply.

B. Upon attainment by the United States of the increase in United States stock levels referred to in Article III, support will be provided to the Government of _____ in the same manner and on the same priority basis as provided to United States Armed Forces with similar missions for common equipment. The Government of _____ will assist in the verification of high priority requirements submitted by _____ military units when such verification is requested by the United States.

C. Where United States stock levels are insufficient to meet Government of _____ demands, due to Government of _____ reduction of United States proposed levels (Article II-B), requisition will be filled in the same manner as those referred to in Paragraph A of this article.

VI. Storage and Modification

A. Government of _____ stocks of material held in the United States system will not be physically separated, or otherwise physically identified.

B. The quality of material furnished by the United States to Government of _____ will be identical in all respects to that furnished to the United States Armed Forces, including all maintenance and modifications work, which normally will be accomplished before material is issued. In those cases where material previously issued requires modification, the Government of _____ may at its own option order the required modification kits in accordance with normal Military Assistance Sales Procedures.

VII. Obsolete And Excess Stocks

A. If a common item becomes obsolete or excess to Government of _____ requirements, but not to the United States, the Government of _____ may request the United States to consider cancellation of its order and to apply its equity in the undelivered quantity to subsequent orders for other items. If the United States does not agree to the cancellation, the Government of _____ will, upon modification by the United States, withdraw the undelivered quantity, or arrange for the United States to dispose of such undelivered quantity with the net proceeds to be credited to the Government of _____.

B. If a common item becomes obsolete or excess to United States requirements, but not to the Government of _____ the United States may request the Government of _____ to withdraw from United States stocks its undelivered quantity of such common items. The Government

of _____ may purchase additional quantities of such common items, from existing United States stocks, at a fair price to be mutually agreed upon, which will not in any case exceed the United States standard price of the item. The Government of _____, with the approval of the United States may place a final order for spare parts in sufficient quantity and type to support the equipment for its probably remaining useful life with the Government of _____.

C. If a common item becomes obsolete or excess to the requirements of both the Government of _____ and the United States, the Government of _____ will, upon modification by the United States withdraw its undelivered quantity from the United States facilities; alternatively, at the request of the Government of _____, the United States will dispose of such common items in accordance with United States procedures and credit the Government of _____ with the Government of _____ proportionate share of the net proceeds.

D. The term "undelivered quantities", as used herein, will be considered to be the quantity the United States has on hand and on procurement for the Government of _____ pursuant to these arrangements.

VIII. Repurchases

A. Upon request of the United States, the Government of _____ will, to the extent compatible with Government of _____ supply requirements, sell to the United States common items delivered to the Government of _____ under these arrangements at a fair price to be mutually agreed upon which will not in any case exceed the price at which the item was sold to the Government of _____ plus the cost of any modification performed at the expense of the Government of _____ and accessorial charges. Transportation will be furnished by the United States.

IX. Stock Losses

Losses to common items stored in United States facilities resulting from natural phenomena, enemy action, normal storage operations, or other accidents or casualties, that have been determined to have occurred due to no fault or negligence of United States personnel, will be assessed proportionately against the United States and Government of _____ in accordance with their respective interests therein. Charges submitted under this provision will include a certification that such losses were not due to fault or negligence of United States personnel.

X. Expansion of Facilities

Any additional capability needed to accommodate stocks ordered by Government of _____ under

these arrangements may be provided by agreement between the United States and Government of _____ for expansion of facilities at Government of _____ expense. If it is not possible to reach mutual agreement on all aspects (including financing) of such action to expand United States facilities, the United States commitment will be limited to fulfilling Government of _____ requirements within the capacity of existing United States facilities not required for United States requirements.

XI. Funding

A. With regard to the MASO's referred to in Article III A, and amendments thereto, referred to in Article III C, the Government of _____ undertakes to make funds available to the United States in such amounts and at such times as required by the United States (1) to pay for material available in existing inventories of the United States to meet the requirements, and (2) to meet payments required by contracts placed for the remainder of the material included in such MASO's and for services required, plus any damages and costs that may accrue from the cancellation of any contracts resulting from changes requirements of the Government of _____ in advance of the time such payments, damages or costs are due. In the case of (2) above, the Government of _____ will, subject to the foregoing undertaking provisionally make payment each month at the rate of 1/12 of the value of the on-order

portion of the stock level required to be held on hand, beginning the month after the agreement is effective. The Government of _____ will in addition concurrently make payments to the United States for the cost of positioning and issuing such stocks from United States depots in amounts in accordance with costs developed by the United States for specific classes of supply.

B. In order to provide funds to cover anticipated withdrawals by the Government of _____ will make payments in full concurrently with placement of orders, and amendments thereto, referred to above in Article III B (1) and III C respectively.

C. Bills covering the preceding calendar quarter for storage, maintenance and modification of stocks (Article III D) will be submitted at the end of each quarter, payment in full will be made by Government of _____ within sixty days after submission of such bills.

D. A charge of 5% of the cost of each MASO, excluding packing, crating, handling and transportation, placed in accordance with Article III, will be added to cover management overhead costs of the United States resulting from Government of _____ use of the United States Supply System. Termination transactions will not include 5% system charge.

E. Subject to the foregoing, billing and collection will be in accordance with the normal United States Military Sales procedures.

XII. Effective Date and Termination

A. This arrangement will be effective when signed and may be mutually reviewed at the end of calendar year _____. At that time, and at the end of any calendar year thereafter, either government may terminate activity under these arrangements; by giving the other government at least 180 days of notice of termination. During the period between such notice and the termination date, the Government of _____ requisitions, if any, will be submitted in the normal manner. All requisitions submitted by Government of _____ and accepted by the United States prior to the termination date will be filled by the United States in the normal manner regardless of whether the termination date will have passed. Subject to the filling of such requisitions, the provisions of Article VII will apply, after the termination date, to the disposition of the Government of _____ equity in the undelivered quantity of each common item covered by the arrangement.

B. In the event of termination of these arrangements, the United States agrees to release to the Government of _____ those installations which the Government of _____ has funded for major improvements or construction, or, if it is necessary for the United States to retain the facility, to negotiate a fair residual value settlement.

XIII. Service Implementing Procedures

Service Implementing Procedures as may be required to implement these arrangements will be entered into by the military agencies of the Government of the United States and the Government of _____ on a "Service to Service" level.

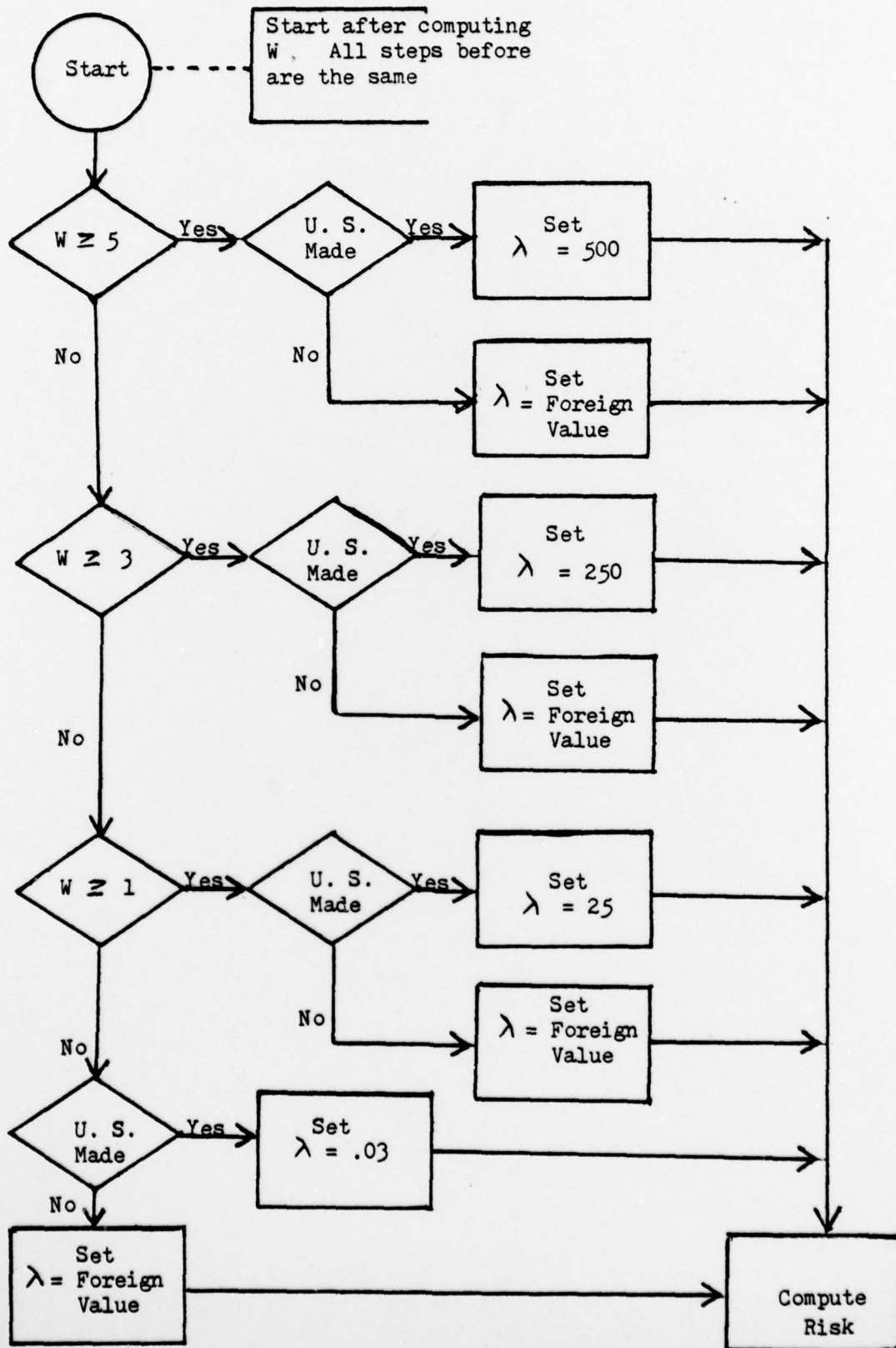
These arrangements are prepared in duplicate in English and in the _____ languages, both texts equally authentic.

Done at _____ this _____ day
of _____, 19__.

For the U. S. Department of Defense For the _____

APPENDIX I
PROPOSED CHANGE TO REORDER POINT FLOW CHART

PROPOSED CHANGE TO REORDER POINT FLOW CHART



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